

Nikolai Dronin and Edward Bellinger

Climate Dependence and Food Problems in Russia 1900–1990



**THE INTERACTION OF CLIMATE AND
AGRICULTURAL POLICY AND THEIR EFFECT ON FOOD PROBLEMS**

VISIT...

LANZAROTE
Caliente.COM

CLIMATE DEPENDENCE AND FOOD
PROBLEMS IN RUSSIA, 1900–1990

Climate Dependence and Food Problems in Russia 1900–1990

**The Interaction of Climate and Agricultural
Policy and Their Effect on Food Problems**

By
Nikolai M. Dronin and Edward G. Bellinger



Central European University Press
Budapest New York

© 2005 by Nikolai M. Dronin and Edward G. Bellinger

Published in 2005 by

Central European University Press

An imprint of the
Central European University Share Company
Nádor utca 11, H-1051 Budapest, Hungary
Tel: +36-1-327-3138 or 327-3000
Fax: +36-1-327-3183
E-mail: ceupress@ceu.hu
Website: www.ceupress.com

400 West 59th Street, New York NY 10019, USA
Tel: +1-212-547-6932
Fax: +1-646-557-2416
E-mail: mgreenwald@sorosny.org

All rights reserved. No part of this publication may be reproduced,
stored in a retrieval system, or transmitted,
in any form or by any means, without the permission
of the Publisher.

ISBN 963 7326 10 3 cloth

Library of Congress Cataloging-in-Publication Data

Dronin, N. M.

Climate dependence and food problems in Russia, 1900-1990 : the interaction
of climate and agricultural policy and their effect on food problems / by Nikolai
M. Dronin and Edward G. Bellinger.

p. cm.

Includes bibliographical references.

ISBN 9637326103 (cloth) -- ISBN 963732609X (pbk.)

1. Agriculture and state--Soviet Union. 2. Agriculture and state--Russia. 3. Crops
and climate--Soviet Union. 4. Crops and climate--Russia. I. Bellinger, E. G. II. Title.

HD1993.D76 2005
338.1'947'0904--dc22

2005006451

Printed in Hungary by
Akaprint Nyomda, Budapest

Table of Contents

LIST OF FIGURES	vii
LIST OF TABLES	ix
PREFACE	xv
CHAPTER 1.	
Introduction: climate and agriculture in Russia	1
1.1. Analyzing the direct impact of weather anomalies on the size of the harvest	9
1.2. Evaluating the scale of crop failure	10
1.3. Linking crop failure and food availability in the country ..	12
CHAPTER 2.	
The availability and reliability of statistical agricultural data for Russia	15
2.1. The pre-revolutionary period (before 1916)	16
2.2. The post-revolutionary decade (1917–1928)	19
2.3. The Stalin era (1929–1953)	23
2.4. The post-Stalin period (after 1953)	25
2.5. Summary	29
CHAPTER 3.	
The pre-revolutionary period (1900–1916)	31
3.1. Major developments in agriculture	31
3.2. Weather variations and agricultural production	44
3.3. Food problems	53
3.4. Summary	66
CHAPTER 4.	
The post-revolutionary period (1917–1928)	69
4.1. Major developments in agriculture	69
4.2. Weather variations and agricultural production	80
4.3. Food problems	89
4.4. Summary	107

CHAPTER 5.

The collectivization of Soviet agriculture (1929–1940)	109
5.1. Major developments in agriculture	109
5.2. Weather variations and agricultural production	123
5.3. Food problems	134
5.4. Summary	151

CHAPTER 6.

The post-war recovery period (1945–1954)	155
6.1. Major developments in agriculture	155
6.2. Weather variations and agricultural production	161
6.3. Food problems	165
6.4. Summary	169

CHAPTER 7.

The virgin lands campaign (1955–1964)	171
7.1. Major developments in agriculture	171
7.2. Weather variations and agricultural production	193
7.3. Food problems	207
7.4. Summary	217

CHAPTER 8.

The period of agricultural intensification (1965–1975)	219
8.1. Major developments in agriculture	219
8.2. Weather variations and agricultural production	239
8.3. Food problems	252
8.4. Summary	265

CHAPTER 9.

The period of agricultural stagnation (1976–1990)	267
9.1. Major developments in agriculture	267
9.2. Weather variations and agricultural production	288
9.3. Food problems	307
9.4. Summary	330

Conclusion	335
------------------	-----

Glossary	341
----------------	-----

References	345
------------------	-----

Index	361
-------------	-----

List of Figures

Figure 1.1. Ratio of grain production to demand in the regions of the Russian Federation, 1990	3
Figure 1.2. Main weather factors affecting agriculture in Russia ..	7
Figure 1.3. Frequency of droughts in the Russian Federation	9
Figure 3.1. Estimated grain balance in European Russia, 1900–1915	35
Figure 3.2. Gross grain production and scale of drought in European Russia, 1900–1915	45
Figure 3.3. Area affected by drought in 1901	48
Figure 3.4. Cereal yield in 1901	49
Figure 3.5. Area affected by drought in 1906	50
Figure 3.6. Cereal yield in 1906	51
Figure 3.7. Area affected by drought in 1911	52
Figure 3.8. Cereal yield in 1911	53
Figure 3.9. Cereal yield in 1891	56
Figure 4.1. Ratio of prices for agricultural and industrial products, 1922–1923	77
Figure 4.2. Scale of drought and grain production in European Russia, 1916–1928	81
Figure 4.3. Area affected by drought in 1920	83
Figure 4.4. Cereal yield in 1920	83
Figure 4.5. Area affected by drought in 1921	84
Figure 4.6. Cereal yield in 1921	85
Figure 4.7. Area affected by drought in 1924	88
Figure 4.8. Mortality rates in Saratovskaya province, 1921–1922 ..	99
Figure 5.1. Grain production and scale of drought in the USSR, 1928–1940	125
Figure 5.2. Area affected by drought in 1931	127
Figure 5.3. Area affected by drought in 1936	133

Figure 6.1. Grain production and estimated basic grain requirements in the RSFSR, 1945–1954	159
Figure 6.2. Grain production and scale of drought in the RSFSR, 1945–1965	162
Figure 6.3. Area affected by drought in 1946	163
Figure 7.1. Estimated grain balance of the USSR, 1954–1965	177
Figure 7.2. Grain production and scale of drought in the RSFSR, 1954–1965	194
Figure 7.3. Area affected by drought in 1963	201
Figure 7.4. Cereal yield in 1963	202
Figure 7.5. Area affected by drought in 1965	205
Figure 8.1. Estimated grain balance of the RSFSR, 1965–1975 ...	230
Figure 8.2. Cereal yield and scale of drought in the RSFSR, 1960–1975	241
Figure 8.3. Area affected by drought in 1972	247
Figure 8.4. Area affected by drought in 1975	251
Figure 9.1. Growth in investment and agricultural output, percent	273
Figure 9.2. Energy expenditure dynamics for grain and sugar beet in Soviet Moldova	274
Figure 9.3. Balance of feed grain in the USSR, 1976–1990	279
Figure 9.4. Grain production and intensity of drought in the RSFSR, 1976–1990	289
Figure 9.5. Area affected by drought in 1981	301

List of Tables

Table 2.1. Grain production in the Russian Empire (millions of tons)	19
Table 2.2. Regions affected by famine, and average food consumption in selected regions of the USSR from 1919 to 1925	21
Table 2.3. Per capita meat consumption (kilograms per annum) in the USSR and European countries	29
Table 3.1. Changes in crop area (thousands of hectares) and population (thousands) in the economic regions of the Russian Empire from 1904 to 1914	37
Table 3.2. The availability of grassland in European Russia in 1897	43
Table 3.3. Cereal yields in the major regions of the Russian Empire in drought years (centners per ha)	47
Table 3.4. Grain production, exports, and domestic residue per head of the population in the 50 provinces of European Russia, 1883–1900 (millions of tons and tons per capita per annum)	57
Table 3.5. Child mortality in peasant families in Voronez province	59
Table 3.6. Grain production per capita and number of migrants from the provinces of European Russia in 1911 and 1912	63
Table 4.1. Changes in cereal crop area from 1920 to 1924, as a percentage of the crop area in 1916	70
Table 4.2. Decrease in area of valuable market crops in Russia, from 1917 to 1920 (percent)	73
Table 4.3. Cereal balance in the 1920s in the USSR (millions of tons)	75

Table 4.4. Cereal yields in major regions of the USSR (centners per ha)	82
Table 4.5. Number of reports of food crises and mass famine, from 1917 to 1925	90
Table 4.6. Low and high official estimates of cereal yields in European Russia and some economic regions (centners per ha)	91
Table 4.7. Estimates of the grain deficit for the rural population in the consumption and productive zones of the USSR between 1918 and 1924 (millions of tons)	92
Table 4.8. Grain surplus and grain procurement in the productive regions of the USSR, between 1918 and 1924 (millions of tons)	96
Table 4.9. Grain production and procurement (official statistics) in provinces most affected by famine in 1921–1922	102
Table 5.1. Grain production and collection (Western low estimates) between 1927 and 1940 (millions of tons)	111
Table 5.2. Changes in crop areas in the Russian Federation (millions of hectares) and economic regions in 1928 and 1934 (thousands of hectares)	113
Table 5.3. The scale of collectivization, grain production, and grain deliveries in regions of the USSR in 1930 ...	115
Table. 5.4. Estimates for grain production in the USSR between 1928 and 1940 (millions of tons)	117
Table 5.5. Official economic indicators of development in the Soviet livestock sector (millions of rubles) in the 1930s	119
Table 5.6. Estimates of the feed grain available for peasants’ livestock in the USSR, 1927–1940, according to recent Soviet and Western data on grain production (millions of tons)	120
Table 5.7. The effect of the weather on the deviation of the grain yield from the trend, 1904–1940 (centners per ha)	124
Table 5.8. Official data on grain production (millions of tons) in the key economic regions of the USSR, 1928–1934 .	128
Table 5.9. Precipitation in spring and summer in the regions of the USSR, 1932	130
Table 5.9.1. Number of reports about food crises and mass famine, 1928–1935	136

Table 5.9.2. Official data on the grain reserve per capita per annum (kg) remaining after grain procurement in the major regions of the USSR, 1928–1933	137
Table 5.9.3. Number and cause of mass protests in rural areas of the USSR in 1930	140
Table 5.9.4. Average food consumption in the USSR in the 1930s, as compared with 1913 (kilograms per annum)	151
Table 6.1. Statistics for Soviet agriculture for the territory untouched by occupation, 1940–1944	156
Table 6.2. The main development parameters for the agricultural sector in the post-war decade in the Russian Federation	157
Table 6.3. Estimates of the grain balance (millions of tons) in the post-war decade in the Russian Federation	158
Table 7.1. Changes in crop area in the Russian Federation, 1950–1965 (millions of hectares)	174
Table 7.2. The main parameters of grain production in the USSR and Kazakhstan, 1949–1965	175
Table 7.3. Grain production and estimated basic grain requirements in the USSR (millions of tons)	178
Table 7.4. Meat and milk production in the Russian Federation, 1957–1965 (millions of tons)	179
Table 7.5. Livestock numbers in the USSR and USA	181
Table 7.6. Fodder consumption in the Russian Federation (millions of tons of feed units)	184
Table 7.7. Fodder consumption per head of conventional livestock per annum in the Russian Federation (centners of feed units)	185
Table 7.8. Grain production (millions of tons) and grain yields (centners per ha) in the USSR and in the virgin lands of Kazakhstan	195
Table 7.9. Grain production in some economic regions of the USSR between 1960 and 1965 (millions of tons)	197
Table 7.9.1. Meat production in some economic regions of the USSR between 1960 and 1965 (thousands of tons)	198
Table 7.9.2. Soviet livestock (as of 1 January)	200
Table 7.9.3. Grain production and procurement (millions of tons) in terms of per capita supply of grain (kg) in the RSFSR in the 1960s	215

Table 7.9.4. Grain production and deliveries in the regions of the USSR between 1960 and 1965 (millions of tons) ..	216
Table 8.1. Changes in crop areas in some economic regions of the Russian Federation, 1965–1970 (thousands of hectares)	220
Table 8.2. Investment in agriculture in the USA and USSR, 1950–1969 (billions of dollars or rubles)	222
Table 8.3. Consumption of artificial fertilizers in the USA and USSR, 1950–1970 (millions of tons)	223
Table 8.4. The profitability of agricultural production after 1965 ..	226
Table 8.5. Grain production and estimation of the basic grain requirement in the RSFSR (millions of tons)	231
Table 8.6. Feed consumption in the Russian Federation (millions of tons)	235
Table 8.7. The main parameters of the development of the livestock sector in the USSR, 1965–1976	239
Table 8.8. Grain production in the economic regions of the USSR, 1966–1970 (millions of tons)	243
Table 8.9. Grain production in the economic regions of the Russian Federation, 1970–1975 (millions of tons)	248
Table 8.9.1. Proportion of sown area affected by drought in the USSR in years of severe drought (percent)	250
Table 8.9.2. Soviet per capita consumption (kilograms per annum)	254
Table 8.9.3. Share of Soviet family budget spent on food consumption, 1960–1975 (rubles)	256
Table 8.9.4. USSR imports of grain and meat, 1966–1977	257
Table 9.1. Investments in Soviet agriculture, and agricultural output (public sector), 1976–1980, as compared with the early 1960s (percent)	272
Table 9.2. Fertilizer application and grain production gains in Soviet agriculture in the 1970s	275
Table 9.3. Plan targets for agricultural production, in the USSR, 1971–1990	276
Table 9.4. Food and grain imports by the USSR, 1985–1990	278
Table 9.5. Sown area of main cereal crops in the Russian Federation, 1970–1987 (percent)	283

Table 9.6. Fodder consumption per head of livestock unit in the Russian Federation (tons per year)	288
Table 9.7. The main parameters of agricultural production in the USSR, 1976–1990	290
Table 9.8. USSR grain supply and utilization (millions of tons) ...	291
Table 9.9. Grain production in the economic regions of the Russian Federation, 1980–1990 (millions of tons)	306
Table 9.9.1. Per capita consumption of selected important foodstuffs in the Russian Federation (kilograms per annum)	308
Table 9.9.2. Proportion of Soviet family budget spent on food consumption, per month, 1960–1975	311
Table 9.9.3. Food consumption in the Soviet Republics, 1980 (kilograms per capita)	317
Table 9.9.4. Official data on meat and milk consumption per capita in selected Russian provinces where food shortages were reported in 1980 (kilograms per capita)	319

Preface

Russia belongs among those countries that are the most vulnerable to climate variability due to unfavorable natural conditions. This, together with a weak agricultural sector as well as poor mechanisms of social insurance, has frequently resulted in crisis situations. During the last hundred years the country has faced numerous severe droughts that have affected its major agricultural zones. In some years, food shortages affected the whole country. Mass famine occurred in the years of political instability in the 1920s, as well as in the 1930s and 1940s.

From the 1960s, the Soviet Union made great efforts to raise its food consumption standards. Unfortunately, the country slipped into the category of being a chronic food importer. In the 1970s and 1980s, the Soviet Union was the largest grain importer in the world. After the breakup of the USSR in 1991, the fall in purchasing power of the population of the former Soviet Union lowered grain and meat consumption, reducing imports in terms of absolute amounts. However, the share of food imports still reaches about 30 percent of the total requirement because of the dramatic decline in the country's own agricultural production. Due to the decline in the livestock sector, comparable only with the decline during World War II, the country now has a grain surplus, allowing some exports in the last few years. However, if the livestock sector were to grow again and the income of the Russian people were to rise in the near future, grain production in Russia would hardly be able to meet domestic demand even in favorable years.

This is the subject of the present historical analysis. Why has Russia experienced permanent food problems throughout its more recent history, and is it likely to face food shortages in the future? The country is characterized by large areas of cropland used for cereals—0.47 hectares per person, which is far higher than the world average figure (0.12 ha). Growth in the Russian population was moderate in the second half of

the twentieth century (0.7 percent per annum) but is now showing a small decline. As with most countries of the world, Russia considerably raised the productivity of its croplands between 1950 and 1980 due to the implementation of the technical achievements of the Green Revolution. The country achieved a cereal yield comparable to that of developed countries located in similar geographical regions—for example Canada. The Soviet Union occupied the third place in the world in terms of per capita grain consumption (842 kg). The Soviet agricultural sector had been receiving good state investment for many decades, comparable with that of any Western European countries and the United States. The question therefore arises as to why Soviet agriculture performed as it did, and what the social implications were.

In addition to its academic interest, this book has been written to fill a gap in the information about food problems in the Soviet Union. Historians are, as a rule, interested in the more dramatic food crises that occurred in the Stalin era. However, new historical sources have become available only recently, providing new facts on this area. The materials show, for example, that a mass famine occurred among Russian peasants in 1924, even though this period is regarded as a time of dynamic economic development in Soviet Russia as a result of the New Economic Policy. Even less is known about the food situation in the Soviet Union in the Brezhnev period. Everybody knows that the USSR faced chronic food problems in the 1970s and 1980s, but the scale of these problems, their geographical distribution, chronological extent and correspondence to climate vagaries have still not been investigated. In the historical literature of this period, coverage of food and agriculture issues is even more scarce than in earlier times, because of the suppression of any information about food difficulties in the regions of the USSR in the era of “developed socialism.”

There are two main sources of original information on the subject. In order to reconstruct the performance of the agricultural sector in key agricultural regions of Russia we have relied on the different official statistical reports on agriculture in the Russian Federation that are available for the last hundred years. The question of the reliability of Soviet agricultural statistics is very important and has been studied in the course of this research. Valuable original information on the agricultural policy and food problems of the country have been accessed in the Open Society Archives of the Central European University (Budapest,

Hungary). The archive has a rich collection of materials (including articles from Soviet and foreign papers, and analytical notes from the institute of Radio Free Europe) on agricultural development, food problems, and many other aspects of the history of the USSR in the postwar period (1950–1990).

The available materials and our selected approach mean that our focus is mainly on the major grain-growing regions of the USSR, such as the Ukraine, the North Caucasus, the Volga basin and Western Siberia. In most national republics of the Caucasus and Central Asia the situation, especially in the 1920s and 1930s, was very specific because of national movements and the prevalence of nomadic traditions. Although in some periods these Soviet republics were very problematic in terms of food, they are not reviewed in the same detail here as the traditional agricultural regions of the country.

We would like to express our acknowledgment to colleagues from the Center for Environmental Studies of Kassel University, headed by dr. Joseph Alcamo, who invited us to participate in a project on modeling climate change and its impact on agriculture in Russia. The model indicates that climate change will bring disadvantages for Russia because of more frequent droughts in the main agricultural zone of the country (Alcamo et. al, 2003). This book would not be possible without this project, since initially the plan was to produce a short retrospective review of the difficulties of the Soviet Union related to climate variability but then, as the archive and other materials were accumulated, it developed into much wider research into the development of Russian agriculture. We would also like to express our gratitude to the team at the Open Society Archives for their permanent support and for the provision of research grants.

CHAPTER 1

Introduction: climate and agriculture in Russia

When analyzing the development of Soviet agriculture it should be borne in mind that Russia is comparatively poorly endowed in terms of agricultural land and climate and that, under any system of farming, agricultural productivity would be appreciably lower than, for example, that of the United States or Western Europe. Russian farming is characterized by its extreme northerly location. The center of Russia lies at roughly the same latitude as Hudson Bay, and St. Petersburg is actually at the same latitude as southern Alaska. Western European countries, although at the same latitude as some parts of Russia, have an unusually temperate climate for their latitude due to the influence of the Gulf Stream.

According to the Köppen (Parker, 1972) climate classification system, the most typical climate in the USSR is “humid continental,” marked by at least some (but sometimes not much) precipitation all year round but with cool summers and cold winters. This type of climate is characteristic for 31 percent of the USSR. By way of comparison, this same type of climate can be found only in small parts of Alaska in the USA. The most typical climate in the USA is “humid temperate,” characterized by rain all year round with hot summers and mild winters. This type of climate is characteristic for 34 percent of the land area in the USA, but is found in only 0.5 percent of the USSR in an area along the Black Sea coast (Parker, 1972).

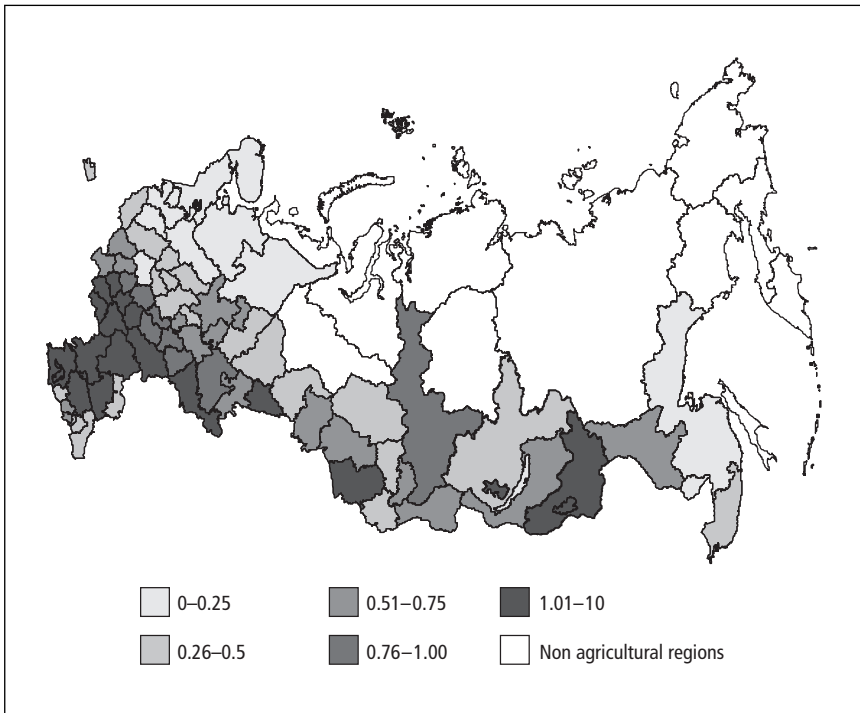
Thermal and moisture regimes determine the potential of the country for agriculture. The thermal condition of the USSR is unfavorable from this point of view. Eighty percent of Soviet cropland falls within the “least productive thermal zone,” the respective proportion for the United States being just 19 percent. On the other hand, the United States has 32 percent of its cropland in the most favorable thermal zone, while the Soviet Union has only 4 percent. The USSR is also unfavorably placed in regard to agricultural moisture. Its continental position means

a low rainfall generally and a more restricted water supply. It has no extensive humid areas corresponding to the American east, southeast and northwest regions, into which moist oceanic air is drawn without impediment. As a result, the average annual precipitation over the United States (782 mm) is much higher than that for the Soviet Union (490 mm) (Field, 1968). Also, according to Gatrell (1986), only 1.4 percent of the land suitable for cereal cultivation was located in an area of optimum combination of temperature and moisture in the USSR. In the United States, the same optimum climate condition was found for 56 percent of its cropland. In Russia, about four-fifths of cropland lay in a zone of risky agriculture, while for the United States only one-fifth of cropland could be regarded as located in that zone.

Climatic conditions determine agriculture in relation to crop composition, productivity, and fluctuations in yields. In terms of crop composition there is a big difference between the USSR and Western countries. Most of the territory of the USSR is so cold that only hardy, early-maturing crops can be grown. The country is also characterized by great variability in terms of the first and last occurrence of frost (White, 1987). Frost limits the length of the growing season, and the lack of days over 20 degrees centigrade restricts the range of crops. The growing season, essentially the period free from killing frost, is only 130 to 160 days long in the Black Earth region, famous for its rich soils. In the central regions of European Russia, the growing season only lasts between 110 and 130 days. Further to the north, the growing season could be shorter than 110 days (Arkhangelsk oblast). The south of European Russia, which is the major agricultural region (the North Caucasus and Volga basin), is characterized by a growing period of 165 to 200 days. In the steppe regions of Western Siberia, the growing season decreases to between 115 and 130 days (Khomyakov et al., 2001). The growing season everywhere in the Russian Federation is considerably shorter than in Western Europe (260 to 300 days).

In the USSR, the most important food crop was wheat, which was planted on more than 50 percent of the cereal-crop area in the 1960s and 1970s. In comparison with most cereals of the moderate zone, wheat is very vulnerable to cool weather and soil acidity. Both of these factors limited the geographical distribution of the wheat crop to the wooded steppe and steppe zones. Winter wheat crops were cultivated mainly in the Ukraine, the Northern Caucasus and the Black Earth regions, where conditions for crop overwintering were most favorable.

Figure 1.1. Ratio of grain production to demand in the regions of the Russian Federation, 1990



The climatic regime to the east (in the south of Western Siberia and northern Kazakhstan), with late but hot summers, dry autumns, and frequently a light snow cover in a severe winter, ruled out winter wheat. In these regions spring wheat was planted, although its average yield was half that of winter wheat (Kruchkov and Rakovskaya, 1990). The climate also favors the hard red grain as against the soft wheat, the former characterized by a shorter growing season and a lower yield (White, 1987).

The localization of the wheat crop in the steppe and wooded steppe zones of Russia resulted in a strong division of the country into two groups of regions—"consumption" and "productive." These were officially distinguished for administrative purposes in Russia from the late nineteenth century. Thus this division in general reflects the natural features of the country and exists to this day. Northern and central "forest" regions traditionally have to import wheat and other agricultural products from southern "steppe" regions of the country (Figure 1.1.).

Rye was another important food crop in Russia. In the seventeenth century rye was the main crop in Russia, reaching 50 percent of the total crop area (Milov, 2001). In the first half of the twentieth century the rye crop still occupied up to 20 percent of the cereal-crop area and only later did its area decline to less than 10 percent. In Russia, a preference for rye again indicates the limitations of Russia's physical environment. Winter rye can withstand colder temperatures than wheat and requires less precipitation, particularly during the growing season. Rye also tended to do better in the gray podzolic soils of the forest zone. The hardier root system of rye penetrated the compacted soils more easily and therefore required less deep ploughing. Rye also competed better with weeds (White, 1987) and was cultivated mainly in the forest zone, the central and northern parts of the country.

In the USSR, the major animal feed cereal was barley. Again, the main advantage of barley is that the crop can withstand early frost and a deficit of moisture. Barley produces adequate harvests when planted in clay soils, although it tends to prefer well-drained loam. These peculiarities of the crop determine the wide geographical distribution of barley in Russia, that is, its cultivation in cooler northern regions as well as in the arid warmer regions of the country. From 1940 to the 1980s, the area devoted to barley crops increased threefold due to a growing domestic demand for feed grain. Oats, another grain grown for fodder, differ from barley with respect to their greater vulnerability to heat and moisture. Oat crops were more affected by drought. On the other hand, oats can withstand the acid regime of poor podzolic soils, which is why the crop was cultivated mainly in the forest zone (Kruchkov and Rakovskaya, 1990).

While the most important feed grain, maize, is the dominant crop in the United States, it is ruled out in Russia by the short growing season and insufficient precipitation. Maize crops are very vulnerable to even slight frost. The optimum growing season for maize is 150 to 180 days. For full maturation the crop requires a thermal level of 200 degree-months and a moisture level of 80 percent, a combination found only in a small part of the USSR (western Ukraine and the Northern Caucasus) but in 35 percent of American cropland (White, 1987). The most favorable combination of degree-days (mean monthly temperatures above freezing) and moisture (ratio of actual to potential evapotranspiration) is 200 degree-days and 8 percent moisture. The same problems are observed in the cultivation of grains such as sorghum, as well as soya beans and peas. Their vulnerability to heat, early frost in autumn, and

acid soils made Russian farmers reluctant to cultivate these crops. Thus one of the problems associated with adverse climate conditions in Russia is the limited cultivation of feed grain crops rich in protein.

Because of the severe climate conditions, average crop productivity in the USSR has always been lower than in Western European countries and the United States. In the first half of the last century, average yields for cereal crops in Russia were 0.6 to 0.8 tons per hectare as compared with 1.0 tons per hectare in the United States and 1.4 to 1.6 in European countries. Even after the modernization of Soviet agriculture between 1965 and 1975, the productivity of its cropland remained considerably lower than average yields in the USA and Western Europe. In general, the gap was the result of the different climate conditions in these countries, but there were other factors involved. Parker (1972) made an interesting observation when comparing yields in the USSR and the USA. He found that in the drier lands they are comparable, but as one moves into areas with a positive moisture balance, yields increased much faster in the United States than in the Soviet Union. For example, in the needle-leaf forest belt (coniferous forests), average yields of oats are four times higher in the American regions than in the comparable Russian regions. The reason for this probably lies in the fact that in cooler, moister parts of the United States there has been a flight from the land, leaving only the best and most productive lands in cultivation. In Russia, however, although some land has gone out of cultivation in the taiga forest and northern mixed forest zone, a much larger proportion of the cultivated land is poor and marginal, which reduces average yields.

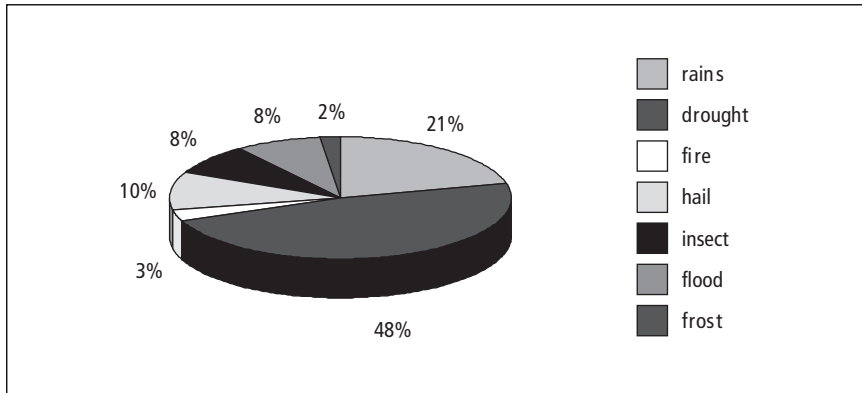
The most remarkable feature of Russian agriculture determined by climate was the great fluctuations in yields. These were much greater than in any other major grain-producing country of the world. White (1987) refers to data published in the late 1930s, which show that the average coefficient of variability of wheat yield, measured over a 50- to 70-year period was, in most of Russia, almost double that of the USA. In the Ukraine, which includes wooded prairies, the coefficient of variation was greater than 24. In core America the coefficient was nearer ten. The core area difference was undoubtedly very much greater, since in Russia it was unsuitable for wheat production, and winter die-off more than made up for lower aridity. The choice of rye as a main crop compensated for lower yields by having less variability, and is itself indirect evidence of the problem.

Kruchkov and Rakovetskaya (1990) found that in the forest zone of Russia, variability of grain production (for the period 1966–1980) reached less than 15 percent in the western part of the country (the Baltic republics and Belarus) and 15 to 20 percent in the central region made up of forest zone and wooded steppes (the Black Earth region) as well as the western part of the Northern Caucasus. Some regions of Western Siberia, located in the southern taiga, are characterized by a variability in grain production of 20 to 25 percent. The variability of grain production increases up to 25 to 35 percent in the wooded steppe of the Urals and the Middle Volga. According to these authors, the highest variability of cereal production—from 35 to 50 percent—was observed in the steppe zone of the Low Volga, the very southern parts of Western Siberia, and northern Kazakhstan. Thus the main grain-producing regions of the USSR were characterized by extreme variability in yields, reaching, on average, 25 percent.

If crop composition and average yields in the USSR were mainly determined by short growing seasons and heat deficits, then the high fluctuations in total cereal production were undoubtedly the result of irregular precipitation. Historical evidence found in KGB reports¹ shows that drought was the major climatic phenomenon most frequently affecting Russian farming. Figure 1.2. shows the frequency of reports of different types of such weather anomalies. Forty-eight percent of all reports mentioned drought as the main cause of crop failure in the regions. The second place is occupied by heavy rains that caused deterioration in the condition of crops mostly in the autumn, in central as well as northern parts of Russia. Hail is in third position. In the USSR hail was regarded as a serious factor and measures were adopted to help reduce the frequency of hail damage by two-thirds in the 1970s (Parker, 1972). It may seem surprising to find frost in the last place, although spring and autumn frosts are traditionally regarded as important unfavorable factors in Russian agriculture.

Drought is an inevitable feature of the atmospheric circulation over the main agricultural zone of Russia. Drought occurs when a mass of dry arctic air invades European Russia and forms an anticyclone. The anticyclone, being quasi stationary somewhere in the southeast of the region, causes the air mass to become drier. Dry, hot air spreads along the southern and southwestern periphery of the anticyclone. An especially strong drought occurs when an anticyclone is fed by an air mass from an Azores anticyclone moving in from the west. Moving across

Figure 1.2. Main weather factors affecting agriculture in Russia



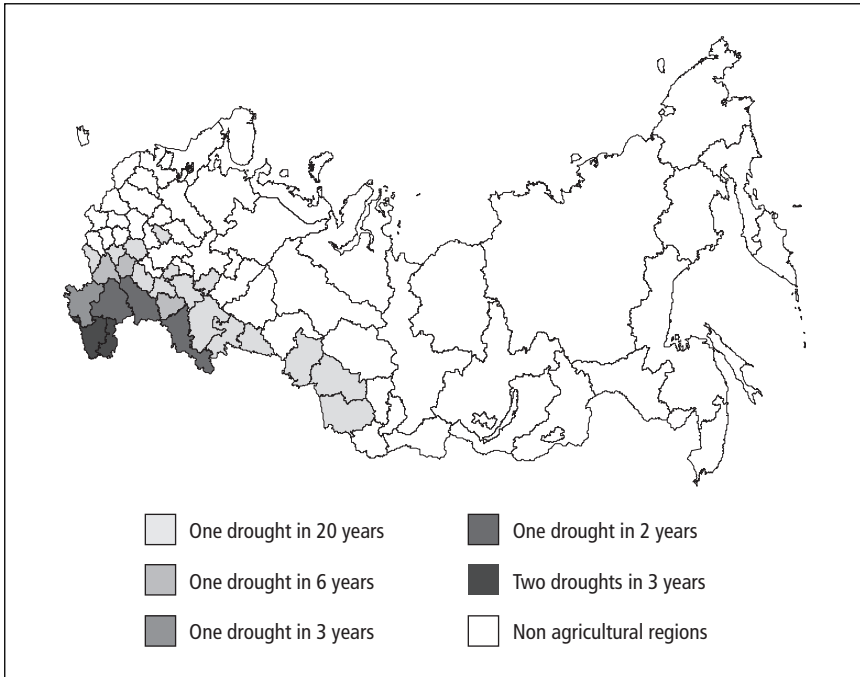
Europe, the air mass loses its humidity and reaches European Russia completely dry (Protserov, 1950). The droughts resulting from these large-scale atmospheric processes usually occupy vast territories of Russia, including the North Caucasus, the Middle and Low Volga basin, and the Urals, and periodically spread over the Central Black Soils region and even northern regions of European Russia. For example, the drought of 1946 affected 50 percent of the total agricultural land of the USSR, which illustrates the potentially vast scale of droughts.

In European Russia, the prospects of a good harvest are associated, first of all, with the meteorological conditions in late spring and early summer. One of the approaches to statistical research on droughts was proposed by Mesherskaya and Blashevich (1990). They found that for the economic regions² of the Russian Federation, droughts affected the agricultural production of a region if 25 percent of the territory of that region had only 80 percent of the normal precipitation and a positive anomaly of temperature over one degree between May and July. According to the authors, and based on these parameters, between 1891 and 1983 Russia went through at least 27 years of climatic drought. Thus, approximately every third year in the twentieth century was dry. The number of droughts differs from one every six years for the Northwestern and Western Siberian regions, to one every three years in the key agricultural areas of Russia, the Northern Caucasus, the Black Earth region, and the Volga and Volga-Vyatka regions. Among the main agricultural regions the Northern Caucasus and Western Siberia have been less affected by droughts in the last century (Figure 1.3.).

An analysis of the droughts that have affected Russia during the last hundred years shows that they occur in three main geographical locations. These types of droughts can be called Central, Southern and Eastern (Experience of Preliminary Analysis, 1933). The Central type of drought (1920, 1924, 1936, 1946, 1972, 1979, 1981, 1984) covers a vast territory in the Volga basin, the Northern Caucasus, and the Central Black Earth regions, as well as some oblasts of the Central region. This type of drought is the most disastrous, in so far as it affected the major agricultural regions of Russia. The drought also affected the forest zone of European Russia resulting in numerous forest fires in the Central and Northern regions. The Southern type of drought (1901, 1906, 1921, 1939, 1948, 1951, 1957, 1975) was limited to the Volga basin (Volga and Volga-Vyatka) and the Urals. Although this type affected a smaller area, it was more intense and often totally destroyed the region's crops. The Eastern type of drought (1911, 1931, 1963, 1965) affected the steppe and forest-steppe in Western and Eastern Siberia at times when the south of European Russia could be characterized as having good weather. The Central and Southern types have prevailed in the last hundred years, reaching 36 and 40 percent respectively. The Eastern type of drought occurred in only 24 percent of the situations, and this relatively low frequency indicates the important role of Siberia in the total grain production of Russia.

There is a clear correlation between harvest size and the scale of drought in the USSR. Droughts have been responsible for the most serious crop failures in terms of grain production in the USSR in the twentieth century. Only a few years of poor harvest can be attributed to other climatic phenomena. For example, the poor harvest of 1980 was caused by continuing cold and wet weather. It is also well known that crop failures in years of large-scale droughts resulted in major food crises in the USSR, as in 1946 and 1963. However, the detailed picture of the impact of drought on the food situation is very complex. When analyzing the situation in a particular year a researcher has to deal with three objectives: (1) to link weather parameters to the size of the harvest; (2) to evaluate the scale of crop failure in terms of a potential for food crisis; and (3) to determine whether there was a high potential risk of crisis and to explain how the existing political system failed (or succeeded) in preventing the food crisis from arising.

Figure 1.3. Frequency of droughts in the Russian Federation



1.1. Analyzing the direct impact of weather anomalies on the size of the harvest

In most cases, statistical data on harvests in Russia are in compliance with weather characteristics available from different historical and scientific sources. However, it should be borne in mind that the links between weather variability and grain production in any one region are not always straightforward. There may be some local details in terms of weather conditions that are not reflected in the statistical data on meteorological parameters (monthly temperature and precipitation). Even a single good rainfall after two months of drought may radically improve the state of the crop, or, in contrast, good weather during May and June could be followed by a few days with too strong, dry winds (*sukhovei*) or dust storms (*mgla*) that damage the crop. Prospects for good harvests also strongly depend on the moisture in the top layer of the soil at the beginning of the growing period, but statistical data on this parameter are rare. The severity of the winter is also an essential factor for the winter crop.

Various remedial measures that were adopted, such as replanting damaged crops, could also explain some of the contradictions between climatic condition and crop statistics.

1.2. Evaluating the scale of crop failure

A scale of harvest decline of approximately 10 percent for a country would be no more than a normal statistical variation from an average harvest, but in certain circumstances the same drop of 10 percent could bring many problems. This potential impact of crop failure on the food situation in a country depends on the balance between agricultural production and domestic requirements. We suggest that if grain production too closely follows demand, the vulnerability of a country to crop failure (caused by, for example, weather anomaly) could be high.

During the last century there were remarkable changes in both grain production and grain requirement in Russia. Before World War II, during the period of collectivization, grain harvests were low. Only after the late 1950s could considerable progress in grain production be observed. This was achieved as a result of two different agricultural policy programs implemented in the Soviet Union. Between 1955 and 1965, a remarkable expansion in crop area in the USSR took place through the so-called virgin land campaign inspired by the then party leader Nikita Khrushchev. In the course of this campaign the total crop area of the USSR increased by 42 million hectares (or 23 percent), mostly at the expense of pasture and grasslands in Kazakhstan and Western Siberia. Such an enormous expansion in arable land over three years is unique in modern world history. As a result of the campaign, the gross cereal production increased, although yields remained unsatisfactorily low.

After the mid-1960s, the emphasis was placed on the intensification of cereal production. From 1900 to 1950, average cereal yields reached only 0.6 to 0.8 tons per hectare. Nor was there any further increase in the early 1960s. Then, starting from 1965, a considerable growth in cereal production can be observed. During that decade (1965 to 1975) the average yield in cereals increased from 1 to 1.5 tons per hectare, that is, by 50 percent. This progress was mainly due to the large-scale application of mineral fertilizers in Soviet agriculture during the period. After 1980, however, there was a stagnation in cereal productivity in Russia, although state investment in agriculture continued to grow.

The grain requirements of the country also changed significantly in the second half of the twentieth century, determined mainly by changes in Soviet animal stocks. The weakness of the livestock sector was traditional in Russia and was evidently connected to adverse climate conditions. Firstly, the Russian peasants suffered because cattle were kept for long periods in stalls, so large amounts of feed had to be stored from the relatively short harvest period. In the heartland of Russia the stall period lasted from 180 to 200 days, while in continental Europe the stall regime was half as long—from 90 to 105 days. In some parts of Europe a milder climate allowed the herd to graze outside all year round at the same latitude as the steppe regions of Russia, where cattle had to be kept indoors for as much as six months. In Virginia, in the United States, for example, cattle do not have to spend any time in stalls at all, and although this is not the case further north in the USA, the period is still much shorter than in Russia. Thus the traditional investment in buildings and fodder required in Russia was a significant burden. The logical consequence was to reduce the relative size of livestock herds, and hence the scale of this important buffer against food-crop fluctuations (White, 1987).

Another problem was that the pastureland and hayfields of the country were in very poor condition and needed large-scale and expensive rehabilitation. The duration of the growing period plays a very important role in the productivity of grasslands. In the Northern and Central regions, where the main pastures and hayfields (in large river valleys) are located, the growing period lasts from 110 to 130 days, which is short in comparison with the growing season in western Europe. In the “productive” regions of Russia, the prospects for raising livestock were not much better. The expansion of cereal crops during the nineteenth and twentieth centuries resulted in a dramatic reduction in pasture and hayfield areas. Moreover, the drier climate of the steppe zone causes lower yields from natural grassland compared with the humid forest zone.

In late 1957, the Soviet authorities launched a first ambitious livestock breeding program, but it had little effect. At the end of the 1960s, a second livestock program, emphasizing the modernization and industrialization of the sector, was launched, radically changing feed-grain requirements.

The imbalance in the livestock and grain sectors became an intrinsic feature of Soviet agriculture. This made the country potentially very vulnerable to crop failure. In order to measure this vulnerability we have provided our own estimates of this imbalance for different periods of Soviet history.

1.3. Linking crop failure and food availability in the country

This subject is the most complicated to analyze since it concerns social and political rather than physical phenomena. When evaluating a crop failure as potentially dangerous for the country, one cannot know for certain whether it would inevitably develop into a large-scale food crisis. No simple or direct links between crop failure and food availability in local stores exist. The crop failure would first impact on the economic, social, and political factors of the country, then these changes would worsen the food situation in the country. Moreover, Soviet history shows that food crises, and even mass famine, could arise for political reasons rather than crop failure.

The agricultural sector played a decisive role in the Soviet economy, employing about one-third of the labor force, absorbing over one-quarter of total investment, and generating roughly one-sixth of the GNP in the 1970s. The result was that the gross national product of the Soviet Union depended heavily on fluctuations in the agricultural sector of the Soviet economy. By way of comparison, agricultural production in the USA provided only 4 percent of GNP while accounting for about 15 percent of Soviet GNP. Thus, when the USSR experienced a severe drop in farm production, it had a far more profound effect on the country's GNP than would a similar agricultural decline on the GNP of the USA.

Researchers can also find in the history of the USSR much material for speculation on the influence of crop failures on key political changes in the country. The revolution of February 1917 began in the bread queues of Petrograd (then St. Petersburg). Two out of the four major political crises within the Communist Party in the 1920s were directly provoked by the failure of the state grain-procurement program (Kochetkov, 2000). It has been argued that the large amounts of grain ordered from Western suppliers in the wake of the 1963 drought were a major factor in the downfall and resignation of Khrushchev (Bush, 1974). Finally, in order to cope with the food shortages caused by two consecutive years of drought, between 1979 and 1981, the relatively young agricultural expert Mikhail Gorbachev, at the age of 49, was appointed a full member of the Politburo of the Communist Party of the Soviet Union.

However, the major social consequences of the droughts were the numerous food crises experienced by the USSR in the twentieth century. When analyzing the food problems of Russia over the last hundred

years, two major periods may be distinguished. In the first half of the century the level of food consumption was below the physiological minimum (2,400 kcal per capita per day). Bread was the major component of a Russian's diet. The proportion of bread reached 55 to 60 percent of the daily calorific intake, while meat made up only 5 percent. In poor years, productive (steppe and forest-steppe) regions found themselves in a better position than consumption (forest) regions. In the post-revolutionary decades Russia was still an agrarian country, with 82 percent of the population living in rural areas. The majority of the population was directly dependent on the cereal crops produced on small plots of land. Mass famine was reported in the 1920s and 1930s in regions affected by drought. The Soviet authorities carried out a devastating policy, expropriating from collective farms and individual farmers as much grain and meat as the state needed at that moment. As a result, the regions that suffered most were the productive regions of Soviet Russia while cities and non-productive regions were supplied with food by the state. Thus the history of famine in the 1920s and 1930s supports the idea that "Droughts are a natural phenomenon; famines are not" (Desai, 1989). The last mass famine in the Soviet Union occurred in 1946 when severe drought affected a larger part of the productive zone of the country.

The year 1950 seems to be a watershed between a period of the risk of absolute food shortage and one of the risk of relative food shortage. During the 1950s, the urban population became dominant in the Soviet Union. The majority of the population depended on the total harvest in the country rather than on the crop in a particular region or district. The priorities of the domestic policy of the Soviet Union had changed. The state was determined to raise the level of food consumption of the population, and this became an important target of the Five-Year Plans. The growth in agricultural (grain and meat) production already allowed the Soviet Union to reach a relatively high average level of food consumption by 1960. In 1970, the level of food consumption was at about the level of Western countries, although the structure of food consumption was still far from optimal. Although the dependence of agricultural production and the food supply on the weather was still strong, it is not easy to show how crop failure resulted in an interruption of the food supply in a given part of the country. The situation was often rather chaotic in terms of geography, and various commodities disappeared from Soviet shops.

Some experts argue that the permanent food deficit at that time was associated rather with the determination of the state to keep food prices unchanged while the cost of food production and the savings of the population increased considerably. According to USDA calculations, there was a strong correlation between GDP and levels of meat consumption in countries around the world, the only exception being Socialist countries, where a relatively high level of meat consumption did not correspond to economic development (Sedik, 2000). Thus the state heavily subsidized food production and supply. Although many staple foods were in short supply in Soviet stores, the country avoided any risk of mass famine. The country did face problems in maintaining the same level of consumption in unfavorable years. The different variants of food rations implemented throughout the country are the main indicators of food shortages in these years. Official statistics for food consumption appear distorted. In the 1980s, food problems led to general disillusionment with Socialism because of the lowering food consumption of the Soviet people.

NOTES

- 1 The diagram is based on materials presented in the two reports “Tragedy of the Russian village: 1927–1939” (Viola et al., 2000, 2001, 2002) and “The Soviet village through the eyes of VChK–OGPU–NKVD: 1918–1922” (Berelovich and Danilov, 2000). These books are a collection of reports by the KGB (OGPU) on the political, social and economic situation in the Russian villages in the period 1918–1939. Many of these reports mentioned the weather conditions if they led to crop damage. The graph is based on data available only for 1918 to 1939, but these 20 years were not regarded as unique in terms of climatic conditions.
- 2 The RSFSR is divided into eleven large economic regions. The first division of the country was proposed in 1923 and since then it has been revised by the Soviet government many times. The present division was established by the State Planning Committee of the USSR (*Gosplan*) in 1961. In 1982, the Northern economic region was divided into the Northern and Northwestern regions, and the Bashkirskaya Republic was excluded from the Urals region and attached to the Volga region. The existing system of economic regions in the Russian Federation includes the Northwestern, Northern, Central, and Central Black Earth regions, the North Caucasus, Volga–Vyatka, Volga, the Urals, Western Siberia, Eastern Siberia, and the Far East.

CHAPTER 2

The availability and reliability of statistical agricultural data for Russia

One specific issue in retrospective analyses of Russian economic development is the availability of reliable statistical data that is freely accessible and can be used to check the claims of any researcher. The availability of Soviet agricultural statistical data at a regional level is extremely important in research on the impact of climate (mainly in the form of droughts) on agricultural production. Ideally there should be no interruptions in data sets for regions and years covered by the statistical reports. Information on agricultural land and crop areas in the regions of Russia seems to be adequately provided in Soviet official reports. These data allow for the reconstruction of changes in the area and structure of agricultural lands over the last hundred years. The availability of information concerning agricultural production is poor compared with the data on crop areas. However, the data published in Soviet statistical reports make it possible to investigate variations in the production of key crops, including wheat and rye, for many decades in the period. Unfortunately, information on livestock inventories, meat and dairy production in the regions is lacking for most of the period. Data on food consumption in the regions are available for only the last few years of the 1980s.

The accuracy and reliability of statistical data published in the Soviet Union remains a key problem. It would be wrong to suggest that the Soviet authorities regularly sanctioned the publication of false statistics in order to mislead their political opponents. If the Soviet authorities did not wish to make public the statistics for a given year, they simply did not publish them (although in such cases the missing data might even appear in official reports a few years later). The problem of the accuracy of Soviet statistics is partly associated with the specific definition of some of the statistical parameters. Naturally the Soviet Union, like many other countries, had its own set of statistical criteria, which

sometimes makes it difficult to compare them with Western agricultural statistics. It is likely that many of the Soviet criteria used in official statistics were elaborated in order to present a more favorable picture of Soviet economic performance. A typical example is the Soviet method of measuring the growth of total agricultural and industrial production. Up until the mid-1950s, Soviet statisticians always used the early-year prices, which tended to exaggerate the size of the growth. On the other hand, American growth was generally expressed in terms of the prices for later in the year, which understated American growth. Technically, both calculations were acceptable, but the mechanics of statistical calculation meant that the USSR looked as if it were growing even faster than it was in comparison with the United States (Goldman, 1968). However, similar calculations of statistical indices should not be misleading to experts. It seems that impressive figures for achievements were published rather for “domestic consumption”. For example, in the 1930s and 1940s, the Soviet method for measuring grain harvests resulted in figures that exceeded the real harvest by 20 to 30 percent. This approach was used in order to raise the planned targets for grain deliveries for Soviet collective farms, rather than to prove to anybody abroad the advantages of collectivizing agriculture.

It is difficult to draw a single portrait of Soviet statistics, in so far as they were dynamic phenomena directly dependent on the political situation in the country in a given historical period. The pre-revolutionary period in Russia was characterized by more favorable conditions for the development of the country’s statistical service. The first post-revolutionary decade and the period of Stalin’s dictatorship (1929–1953) both appear very problematic in terms of the reliability of statistics, although in different ways. After 1956, the Soviet Union became more open with its statistical information, although the problem of reliability regarding some data certainly still arises.

2.1. The pre-revolutionary period (before 1916)

The history of the Russian statistical service begins in 1858, when the Central Statistical Committee (TsSK)¹ was established. The Central Statistical Committee was formally under the aegis of the Ministry of the Interior of the Russian Empire. Later, many other government departments of the Russian Empire also established their own statistical departments. For example, by the end of the 1890s the Ministry of Finance

and the Ministry of Trade and Industry had established their own statistical services. From the very beginning the work of the Central Statistical Committee and other statistical bodies focused on the agricultural development of the country. However, before the early 1880s, data on sowing areas and yields are fragmentary. In 1880 a special commission of the TsSK adopted a program whose aims were to collect data on crop areas once every five years, and data on harvests annually. In 1881, crop areas were calculated by the TsSK for the first time (the second investigation took place in 1886–1887) (*Statistika Rossiiskoi Imperii: 1883–1887*, 1888). It was only after 1883 that reasonably reliable and regular figures on crop harvests (cereals, potatoes, and industrial crops) became available, when the Central Statistical Committee published annual reports. These were based on information supplied by local correspondents about the area under cultivation and the average yield for each crop (Gatrell, 1986). In addition to the statistical data, some calculations, for example grain production per capita, average yields for different periods etc., were produced. Annual statistical reports contained some analytical comments concerning agricultural performance and the general food situation in the given year. In addition, maps and graphs were included in these reports. For a long time the agricultural figures related only to the 50 provinces (and 10 provinces of Poland which then belonged to the Russian Empire), and thus exclude Siberia, the Caucasus and Central Asia. After 1899, data on crop areas and crop yields for these newly colonized regions were published in annual reports. From 1900 to 1917, more than 20 statistical reports concerning agriculture were published in the Russian Empire.

Unfortunately, data on the livestock sector were hardly ever included in Russian annual reports at that time. Livestock figures can be found in only a few statistical yearbooks in the pre-revolutionary decades. Only after 1904 did data on cattle numbers start being provided annually (*Rossiiskaya gosudarstvennaya statistika: 1802–1996*, 1996). Some modern experts question the reliability of livestock statistics. Gatrell (1986) notes that the tsarist government required village police officers to conduct a regular head count of animals in each district. He argues that it is easy to imagine how misrepresentation and error crept in. The same applies to the periodic census of army horses. As with grain production data, this information did not (prior to 1900) take into account livestock herds beyond European Russia.

Wheatcroft and Davies (1994a) also state that our knowledge of the growth rate of livestock farming in pre-war decades is frustratingly imperfect. Neither the absolute numbers of livestock nor their rate of increase can be known with certainty. In addition, no data are available about changes in the average weight of farm animals in this period. Meadows and pastures, which were used almost entirely by livestock for fodder, also receive little attention in the statistics in spite of their importance for livestock production.

No information about meat and milk production was published in the Russian Empire, nor was any statistical research carried out in order to determine the food consumption of Russian peasants.

The statistics on crop areas and harvests published in the Russian Empire are not always considered sufficiently reliable, and these data were severely criticized at least twice in pre- and post-revolutionary times. On the first occasion, the official data were criticized by statisticians of the *zemstva* (units of local government, elected on a restricted franchise). The establishment of *zemstva* was part of the political and economic reforms aimed at the abolition of peasant serfdom in 1861. From the end of the 1860s, the *zemstva* also began to establish their own statistical agencies, which were very active in pre-revolutionary times. In their studies of peasant economy, including the budgets of peasant households, they were world pioneers. In 1916, the *zemstva* statisticians were permitted to organize the first all-Russian agricultural census (Wheatcroft and Davies, 1994b).

The *zemstva* statisticians were extremely suspicious of the TsSK, which they regarded as a puppet of the tsarist government. However, modern experts point out that statistical reliability could not be claimed exclusively by either competitor. They conclude that the grain harvest data provided by the TsSK, much criticized for underestimating production, were reasonably reliable. On the other hand, they argue that some of the data were not so good. For example, population data in the years following the 1897 population census were greatly overestimated (*ibid.*).

The absolute levels of pre-war grain production were also the subject of fierce debate after the revolution in 1917. Many Soviet economists and statisticians argued that the official statistics prepared by the TsSK were considerably underestimated. In the 1920s, the State Planning Committee (*Gosplan*) claimed that the pre-war harvest figures should be increased by 19 percent, because both yields and sowing areas had been underestimated. In 1925, a large correction coefficient was accordingly

applied to the official pre-war figures. However, in the 1930s the coefficient was drastically reduced, evidently in order to present a more favorable picture of Soviet agricultural performance in comparison with that in tsarist times. From 1960 onwards, Soviet official statistics reduced the pre-war harvest figures to 5 percent below the original TsSK estimate (Wheatcroft and Davies, 1994b). Thus the last estimation of grain production made by Soviet statisticians was close to the original data from the statistical reports of the TsSK. Western estimates are even closer to the original figures (Table. 2.1.).

Table 2.1. Grain production in the Russian Empire (millions of tons)

Years	1909–1913	1913
Russian Empire statistics	68.5	79.3
Gosplan estimate in the 1920s	81.6	94.4
Soviet estimate in the 1930s	67.6	80.1
Revised Soviet estimate in the 1960s	65.2	76.5
Western "low" estimate	68.0	79.0

Source: Wheatcroft (1974).

2.2. The post-revolutionary decade (1917–1928)

Many experts welcome the abundance and diversity of statistical data published in the first post-revolutionary decade. In fact, in the late 1920s and early 1930s, the Soviet Union published immense quantities of data about every possible subject. Its yearly plans contained the minutest details. Besides data on crop areas and harvests, experts could find in the Soviet reports of the 1920s statistical information about peasant budgets, the state provision of agricultural products, and food trade between regions. For the first time in history information on food consumption for different groups of the population, both rural and urban, at regional level were compiled and published in Russia. For example, the drought of 1921 was the subject of extensive analysis. A Soviet statistical report of 1924 contained precise data on the areas of different crops devastated by drought (*Sbornik statisticheskix svedenii po Souzy SSR: 1918–1923*, 1924). Local statistical agencies were also productive. For example, a local statistical report for Saratovskaya province (Middle Volga) presents detailed information on crops, food consumption, bread reserves, and changes in mortality among the local population for this

disaster year (*Statisticheskii sbornik po Saratovskoi gubernii, 1923*). The lack of data on the livestock sector in the Soviet statistical reports is the single exception.

Despite the diversity and abundance of statistical reports, this period is controversial in terms of their reliability. One spectacular example of this problem occurred in “Materials on statistical data of the Soviet Union for 1918–1923” (*Sbornik statisticheskikh svedenii po Souzy SSR: 1918–1923, 1924*). The materials contain very promising results for field research on the food consumption of the urban population and peasants in different regions of Russia. The research was conducted between 1918 and 1923. Unfortunately, there is much doubt about the representative character of this data. The statistics indicate too high a level of food consumption in rural and urban areas of Russia, while numerous historical documents give a desperate picture of severe food crisis and mass famine in many regions. The materials of the KGB for the 1920s represent the best and most detailed collection of documents on the food catastrophe in the regions, with a population of around 30 million people (Berelovich and Danilov, 2000a, b). Table 2.2. provides a comparison between the official statistical data on food consumption as calorific intake per capita per day, and historical evidence of mass famine. One can conclude that there is a contradiction between the historical evidence and the statistics for 1919 to 1924.

Kochetkov (2000) also notes that historical KGB documents (reporting very low levels of food consumption in the 1920s) contradict the results of statistical field research by the Soviet statistical service in the first half of the 1920s. According to Kochetkov, the researchers themselves openly acknowledged that their field investigation had not covered all groups of peasants. There was still social differentiation among Russian peasants in 1923–1925. A significant number of peasant families had a small crop area of between 0.2 and 0.3 hectares. The middle class of Russian peasants possessed 1 to 1.1 hectares of crop area per family, while the richest group of peasant farms typically had 2.6 to 3.1 hectares of crop area (Vilensky, 1980). Field statistical research was most common among peasants who owned an average or higher than average number of acres (from 54 to 61 percent). These groups of peasants consumed much more food than landless peasants or those owning small plots. Among the former the level of bread consumption reached 230 to 330 kilograms per capita, while among the latter it reached 160 to 190 kilograms per capita per annum. In Russian villages in the 1920s, the

Table 2.2. Regions affected by famine, and average food consumption in selected regions of the USSR from 1919 to 1925

Region	1919	1920	1921	1922	1923	1924
Bashkirstan			2,074	1,792	3,824	4,404
Vladimirskaia obl.	3,505	3,341	3,472	3,208	3,634	3,993
Voronezhskaya obl.		2,741	2,061	1,834	3,723	4,542
Vaytskaya obl.	3,436	3,095	2,519	2,523	3,147	3,859
Sverdlovskaya obl.	3,549	3,249	2,996	2,729	3,511	3,841
Krasnodarskaya obl.		4,069	1,825	1,497	4,015	4,413
Ivanovskaya obl.	3,564	3,217	3,420	3,641	3,790	4,026
Irkutskaya obl.			4,027	3,729	3,781	4,567
Kalyzhskaya obl.	3,089	2,977	2,496	3,526	4,004	3,995
Kostromskaya obl.	3,157	3,223	3,173	3,605	3,677	4,120
Kurskaya obl.	4,797	3,790	3,364	3,021	4,401	4,537
Leningradskaya obl.	3,299	3,333	3,041	3,724	3,645	
Pskovskaya obl.	4,195	3,565	3,544	3,837	3,604	3,878
Ryazanskaya obl.	2,949	2,486	2,389	2,352	3,959	4,076
Samarskaya obl.	4,479	3,263	1,130	1,420	3,597	3,779
Saratovskaya obl.	4,474	3,626	2,615	1,762	3,892	4,323
Simbirskaya obl.	3,946	3,273	2,029	1,801	3,696	4,048
Stavropolskaya obl.		4,327	3,444	2,256	3,734	4,820
Tambovskaya obl.	4,217	2,738	2,379	2,219	3,829	4,076
Tatarstan			2,081	1,722	3,153	3,903
Tverskaya obl.	3,260	3,484	3,518	3,619	3,555	4,059

2,074 Regions affected by mass famine according to KGB reports

3,824 Average food consumption in region, kcal per capita per day (field observation)

Source: Berelovich and Danilov, 2000a, b; *Sbornik statisticheskix svedenii po Souzy SSR: 1918–1923, 1924.*

proportion of the relatively well-off group did not exceed 20 to 35 percent, that is, half of the 54 to 61 percent adopted in the statistical field research. Thus the author argues that this statistical investigation was not representative for Russian peasants between 1918 and 1923 (Kochetkov, 2000).

The most important data for grain production are also questionable. Such problems are evident from the time of the civil war that followed the social revolution in 1917. The extent of the sowing area and

the size of the grain harvests in 1918–1919 were concealed from the authorities by the peasants. The first post-revolutionary agricultural census was organized in 1920. The collection of materials for the census was a difficult and dangerous business. In the preface to the statistical report on the results of the census, one editor claimed that 26 field researchers had been killed and 25 robbed by bandits during the one and a half months designated for the census (*Trudy Tsentralnogo statisticheskogo upravleniya*, 1922). Evidently the quality of all the data was jeopardized by the hostile attitude encountered by the statisticians in many regions.

In the mid-1920s, obtaining accurate figures from peasants for crop areas and yields was still problematic. The Soviet statisticians who prepared grain data were aware that the figures obtained from the peasants were certainly underestimates. Thus “correction coefficients” were applied, which increased the harvest as measured by figures supplied by the peasants. These correction coefficients were not fully justified by observation, while the figures calculated on their basis contradict the historical evidence of famine in many regions between 1920 and 1925 (Kochetkov, 2000).

Data on crop areas are based on field research covering 5 percent of rural villages between 1923 and 1926. Statisticians believed that a considerable part of the crop area was concealed by the peasants in order to avoid high agricultural taxes. There could also have been other sources of errors. For example, the list of villages for field research was compiled by local statisticians, who showed a preference for the more prosperous villages. The field research was conducted in spring and the sown areas calculated were, as a rule, larger than the harvested areas, since some of the crops could be destroyed by weather anomalies. Such errors could thus lead to an exaggeration of production, and other errors to an underestimation of the real crop area and harvest. However, between 1923 and 1926, the Central Statistical Committee used coefficients from 10 to 30 percent to increase the data obtained from field research in different regions (*ibid.*).

Statisticians also used a coefficient for the “correction” of field data on crop yields. A correction coefficient for data from (autumn) field research was introduced by Soviet statisticians, suggesting that peasants were deliberately giving too low an estimate of crop yields. A statistical report published in 1924 contains data on yields for 1923 before and after correction. The average yield was corrected by 22.4 percent for the Russian Federation (it ranged from 12 percent for the Central region to

43.5 percent for the Low Volga region) (*Sbornik statisticheskix svedenii po Souzy SSR: 1918–1923*, 1924).

In the second half of the 1920s, the correction coefficients became even larger. Many Western experts believe that from 1926 onwards these correction coefficients were, almost certainly, too large. These large correction coefficients were estimated under the influence of *Gosplan*, which strongly believed that both pre-revolutionary and post-revolutionary grain outputs were higher than the estimates provided by the rival Central Statistical Board¹. The conflict between *Gosplan* and the Central Statistical Board had already started in 1922, and this discussion was politically colored from the start (Wheatcroft and Davies, 1994b).

2.3. The Stalin era (1929–1953)

This period is prominent due to the lack of any reliable statistical data on agriculture and the economy in the Soviet Union. Most of the statistical parameters published in the pre- and post-revolutionary period are missing in the Stalin era. The most important data on cereal production were incorrect, if not deliberately falsified. The turning point was in 1936, when the Stalin terror led to the suppression of any economic data. In the last years of Stalin's life, hardly any statistics were published. In fact, no statistical reports were published in the period from 1939 to 1956.

Certain political events led to the establishment of this policy of secrecy and the falsification of agricultural and other statistics. Incorrect statistics on grain production had played a very important role in the adoption of the plan for the mass collectivization of Soviet peasants in 1927–1928 (see Chapter 4). Steps were taken to place the Central Statistical Board under strict political control. On 30 January 1930, the TsSU was amalgamated with *Gosplan* as its “economic-statistical sector”. In 1930–1931, the scale of central statistical work was greatly reduced. General statistical reports stopped appearing in the press (Wheatcroft and Davies, 1994b).

Only a few statistical data were published in the Soviet Union from 1929 to 1953. Data on crop production for the economic regions are available for 1929 to 1934 (and data on crop areas can be found for 1929 to 1938) (*Selskoe khozyastvo SSSR v 1935*, 1936). The reliability of these data is questionable. From 1929 onwards, strong political pressure was brought to bear on the statisticians to “improve” grain production by increasing the correction coefficient still further. All the grain figures

published between 1926 and 1932 therefore need to be reduced by an annual percentage that systematically increases over the period. Archive data for the harvest of 1932 reveal that both the yield per hectare and the sown area actually harvested were substantially lower than the figures used to estimate grain production. The 1932 harvest probably amounted to only 72 to 79 percent of the official figure (Wheatcroft and Davies, 1994a).

From 1933, a new method of measuring harvests was introduced in the Soviet Union. In official Soviet statistics from 1933 onwards, grain output was measured—without any indication that a new method was being used—not in terms of the harvest that reached the barns but in terms of “biological” yield. This was the maximum possible yield of the standing crop in the field at the moment of maximum ripeness. It was estimated by taking samples from a variety of fields using a *metrovka* (a one-meter-square quadrat). The samples were then threshed and the grain obtained was weighed. The total harvest was measured by multiplying this measured yield per square meter by the estimated sown area. Thus the “biological” harvest made no allowance for losses between field and barn. However, in reality such losses amounted to approximately 15 percent rising to over 30 percent in some years. Until 1936, some allowance was made for losses, though often an inadequate one. From 1937, no harvest losses at all were deducted (Wheatcroft and Davies, 1994a).

This approach helped the Soviet authorities to raise the year-plan estimates and thus to force *kolkhozes* (collective farms) and *sovkhozes* (state farms) to deliver more grain to the state. In January 1954, Premier Nikita Khrushchev (in a speech devoted to his plan for the cultivation of “virgin” lands) openly acknowledged for the first time the unreliability of agricultural statistics based on “biological yields”. He provided figures allowing the evaluation of the correction that needed to be applied to the official figures on grain production. The exaggeration was greater than many of the fiercest Western critics had thought possible.

From the 1950s, Soviet experts tried to correct the false data on grain production in the 1930s and 1940s. According to official Soviet statistics the data on the harvests of 1928 to 1932 could remain unchanged, but the data for 1933 onwards should be radically decreased (see *Narodnoe khozyastvo*, 1987). Western experts have used the corrected Soviet data as compatible with the data for earlier years with the correction removed. However, with reason Western experts doubted the relia-

bility of the data for 1928 to 1932, thus the official Soviet figures were reduced by a rising correction coefficient to allow for the increasing distortion in the official estimates even before the notorious switch from “barn harvest” to “biological yield” had been introduced. For the crucial year 1932, as mentioned above, these lower estimates are confirmed by archival data.

Despite all of these corrections the data only provide a little help, since they concern only the gross grain production of the country. No corrected data are available for the regions, whether for oblasts or the economic regions. Data for the economic regions from 1928 to 1932, as well as earlier data, can be used only for a comparative analysis of regions or years, and then only with the greatest caution. Unfortunately, no data can be used for 1933 to 1953.

2.4. The post-Stalin period (after 1953)

After Stalin’s death in 1953, the situation was radically getting better. More statistical data were published and their reliability improved. The Soviet statistical service was removed from the structure of *Gosplan USSR* and formally became an independent agency—the Central Statistical Board—under the aegis of the Council of Ministers of the USSR (TsSU) in 1948. The statistical service of the USSR was given greater independence from planning and executive organs in 1956. In connection with the radical administrative reforms initiated by Khrushchev—the abolition of industrial ministries and the creation of *sovnarkhozes* (councils of the people’s economy)—the main forms of statistical report that had previously been maintained by the ministries were then passed to the TsSU USSR bodies (*Rossiiskaya gosudarstvennaya statistika: 1802–1996*, 1996). Since there were no radical changes in the position of the statistical service of the USSR from 1956 to the late 1980s, this extended period can be treated as a whole. In 1987, the Central Statistical Board was upgraded to the level of the Union Republican Committee of the USSR on Statistics (*Goskomstat USSR*). This was accompanied by considerable modifications to the existing system of statistical indicators, in order to bring them into compliance with international practice.

The publication of regular statistical reports on the economy of the USSR was resumed with the first post-war statistical handbook in 1956. Some reports published in the late 1950s were to fill information gaps

for previous years. Some data on crop areas, cereal harvests, potatoes, and meat production for 1940, 1942, 1943, and 1944 were published in 1959 in the official statistical report *People's Economy (Narodnoe khozyastvo SSSR v 1941–1945, 1959)*. A report from 1957 provided data on crop areas at a regional level for each year from 1950 to 1956 (*Posevnyye ploshadi SSSR, 1957*). Data on cereal and wheat production were regularly issued from 1957, and information on livestock inventories was widened at the same time. Soviet statistical reports started to publish regular data on meat and milk production from 1956. Goldman (1968) argues that although Soviet statistics had not solved the problems of absolute statistical precision, and although there were still statistical shortcomings, the amount of statistical coverage in post-war USSR had widened beyond reasonable expectation.

The openness of Soviet statistics was challenged in years of serious crop failure, and some attempts were made by the authorities to conceal information. After the catastrophic harvest of 1963 in Kazakhstan and Western Siberia, which made a fiasco of the “virgin” lands campaign, no figures for gross grain production were published in the Soviet Union. Instead, the Soviet statistical report of 1963 provided data on grain deliveries to the state, which were significantly lower than the average for the two previous years. In 1969, when the grain harvest was 20 million tons short of the average level, some Western experts were aware that crop figures had been manipulated and that many crops reported as harvested had rotted in the fields because it was too wet (*Christian Science Monitor*, 5 June 1970). In the summer of 1975, when the worst grain harvest was reported, the information was at first strictly limited (according to experts from the USDA). This caused Western correspondents in Moscow to speculate about serious problems in Soviet agriculture. However, in the annual economic report published on 1 February 1976, the figures were announced quite unambiguously. Poor harvests in the USSR occurred in 1981 and 1984 and the annual statistical reports for these years contain no figures causing Western experts to suggest that the harvest was even worse than in 1975 (which was not the case) (*The Soviet grain and fodder balance: 1981–1982, 1982*).

Despite the fact that only a few Soviet statistical reports were issued, they contained sufficient information for a detailed analysis of the development of Soviet agriculture and its subsectors. For example, in 1963, although the figure for gross grain production was not published, the annual statistical report contains a lot of other information which allows

conclusions to be drawn about the drastic situation in terms of grain production in the country. The report contains figures showing a fall in milk and butter production. In contrast, the output of meat rose by 10 percent. This was interpreted by experts as an indicator of the panic slaughtering of livestock. Moreover, the statistical report of 1963 on the national economy ("On the results of the fulfillment of the states plan for the development of the national economy in 1963"), published in all central Soviet papers, explained to readers that in connection with the shortage of feed, collective and state farms had conducted, in an organized fashion, a larger than usual thinning out of herds at the end of the year, preserving family livestock (*The Economist*, 1964).

In the early 1970s, the US-USSR Secretariat for the Exchange of Economic Information was set up. Experts from the USDA regularly received data on Soviet agriculture and on this basis could monitor its current state. For example, Soviet data on numbers of pigs and poultry, and meat production on a monthly basis, as well as grain utilized as feed for each year, were available to American experts, who were thus able to assess the Soviet demand for feed grain. From 1973 the USDA started publishing these Soviet data in its analytical review on foreign agricultural development (Settle and Gruff, 1980). For example, in 1979 a US team of grain and feed specialists made an official trip to the USSR under the US-USSR agricultural agreement exchange program. They produced a detailed report on the situation in the Soviet feed industry (Severin, 1979).

The Soviet Union used its own definitions for key parameters, which prevents comparison with Western estimates. Generally, the Soviet agricultural statistics appear sufficiently reliable for an analysis of the variations in agricultural production from year to year. However, their use of Soviet figures as an absolute base is problematic. Soviet and Western categories and classifications differ so widely that a comparison of their data should be taken merely as indicative. Western experts did not accept the Soviet figures for gross grain production and gave considerably lower estimates. The USDA estimate and Soviet figures for 1962 to 1970 differ by as much as 25 to 30 percent (see *Bulletin of the USDA*, 1971; *Selskoe khozyastvo SSSR*, 1971).

This gap between the Soviet figures and Western estimates for Soviet gross grain production originates from differences in the definition of this statistical parameter. Firstly, total Soviet grain production figures include wheat, rye, oats, barley, corn, millet, grain sorghum, rice

buckwheat, pulses, and other miscellaneous grains not included in the Western definition of the term. The USDA includes in its statistics only wheat, rye, corn, barley, and oats.

Secondly, the Soviet definition of grain is in terms of “bunker weight”, the weight of the grain in the bin of the harvester. Therefore, it can include excess moisture, pieces of straw, weeds, and other chaff. Western statistics measure the weight of the grain in a dry condition. This results in a difference of as much as 5 to 6 percent between Soviet and Western estimates. After the establishment of the *Goscomstat* (in 1987), Soviet statisticians revised some earlier data on grain production on the basis of dry weight (compare, for example, data published in *Selskoe khozyastvo SSSR, 1971* and *Selskoe khozyastvo v Rossii, 2000*).

The Soviet definition of another key statistical parameter, “meat production” and “meat consumption”, is a more complex question. In the 1970s the Soviet press often compared its statistics on food production and consumption with that of Western countries to its own benefit. For example, in 1978 the USDA, in its review of foreign agriculture, published data on meat consumption in the USSR which showed that it equaled European standards (Table 2.3). All these statistics were prepared or estimated on the basis of official government statistics. Foreign official organizations had no choice but to refer to Soviet official data in spite of doubts about that data. Figures for the Soviet Union were in clear contrast to the chronic food deficit in central cities of the Soviet Union in the late 1970s. This provided Western experts with ammunition when questioning the reliability of Soviet data on meat production and consumption.

It could be suggested that the Soviet calculations for meat production and consumption, since the latter were calculated directly from meat production figures, are misleading. First of all, the TsSU’s concept of edible meat and meat products is believed to embrace fats, offal, byproducts, and slaughter fats that are generally excluded from Western measurements (Bush, 1974). There were a few attempts to recalculate meat production and meat consumption figures on the basis of the Western approach. Such calculations were made by the FAO for the Soviet Union for 1969. They reveal that the Soviet per capita meat consumption was far below official expectations. Officially, Soviet meat consumption per capita in 1969 was 45 kilograms, as compared with 48 and 49 kilograms in 1968 and 1967 respectively. However, these figures were also inflated. The FAO’s calculations show that meat production

Table 2.3. Per capita meat consumption (kilograms per annum) in the USSR and European countries

Country	1972	1973	1974	1975	1976	1977
USSR	45.7	45.1	50.0	50.8	44.9	48.4
Norway	41.8	42.0	46.7	47.4	48.3	50.3
Finland	46.2	50.3	50.9	54.9	53.9	51.0
Sweden	49.2	50.4	55.5	56.7	59.2	58.1
Portugal	36.5	38.2	40.5	41.3	43.8	46.9
Spain	47.5	52.6	56.0	53.7	56.0	58.4
Netherlands	56.3	55.7	59.6	62.4	63.7	63.7
Italy	57.0	60.8	58.4	57.8	58.7	61.0

Source: Bulletin of the USDA, August 1978.

in 1968 was only 26 kilograms per capita (just 54 percent of what was stated), compared with 80 kilograms in the United States, 52 kilograms in Poland, and 68 kilograms in Czechoslovakia (*Christian Science Monitor*, 5 June 1970). This difference between the Soviet calculations and those of the FAO was apparently due to the fact that Soviet meat production statistics, in contrast to statistics elsewhere, include lard, pork fat, heads, and edible organs as meat. In our opinion this would explain, but only partly, the contradiction between the high figures for meat production and consumption and the chronic meat deficit in the USSR. The Soviet data on food consumption should be questioned in a more critical way (see Chapter 8.3), even if international practice is still to adopt official Soviet statistics, and Soviet and modern Russian statisticians have never revised earlier data on meat production and consumption.

2.5. Summary

The situation in terms of Soviet statistics may appear complex. Many statistical data for the Soviet Union are missing. Agricultural development and, especially, food consumption have always been sensitive issues in the Soviet Union. In the Stalin era most data, including those on food consumption, were only circulated with the classification "highly confidential". However, before and after the Stalin regime, official statistical reports contained a lot of data. The main problem is one of reliability. In fact, there is no period in the history of Russia for which the

official statistics have not been questioned by Western, and even Soviet, experts. Sometimes the official statistics published in a given period were later revised by Soviet statisticians themselves, and sometimes these revisions were officially canceled at a later date. In the West, many experts devised their own correction coefficient for Soviet statistical data. Fortunately, a great deal of information is now available which enables experts to examine the actual statistical procedures carried out in the Soviet Union. Vast amounts of formerly secret archive material have become available, providing an opportunity to test the reliability of much data. In general we share a position of “restrained optimism”, as expressed by Nove: “It must be admitted that difficulties exist, but they are certainly not insuperable” (Nove, 1969).

NOTES

- 1 The official name of the Russian statistical service changed several times: 1858, the Central Statistical Committee (TsSK), under the aegis of the Ministry of the Interior of the Russian Empire; 1918, the Central Statistical Board; 1927, the Central Statistical Board of the USSR; 1930, Economic and Statistical Section of Gosplan USSR; 1931, Central Administration of Economic Accounting (CAEA) of Gosplan USSR; 1948, Central Statistical Board under the aegis of the Council of Ministers of the USSR; 1987, Goscomstat.

CHAPTER 3

The pre-revolutionary period (1900–1916)

This period covers the last years of the Russian Empire. From the point of view of economic development, the pre-war period presents a continuation of the process of reform in Russian society which started with the abolition of serfdom in 1861. The process of the modernization of the country was at times held up by more conservative moves. An unprecedented growth in the population and a shortage of land in the central regions made reform very urgent. In 1904 and 1905 there were numerous incidents of peasant unrest in many provinces in European Russia. From 1906, more radical reforms were launched in order to transform the country from an agrarian society based on patriarchal peasant communes into a capitalist society with a class of free farmers. By the early 1910s, the market economy was already affecting the lives of millions of Russian peasants. However, the main characteristic of the period as a whole is that Russia remained a poor country in which the majority of the population relied on small plots of land for food. This period ends with World War I and the two revolutions that followed in February and October 1917.

3.1. Major developments in agriculture

At the beginning of the twentieth century the Russian Empire was largely an agrarian peasant country. In around 1910, the urban population made up 20 percent of the total and required only 7 to 8 percent of the sown crop area to support it. Private farms with a cultivation area of more than 50 hectares provided only 5 percent of the total agricultural production of the country. More than 89 percent of agricultural land belonged to the Russian peasants (Chelintsev, 1928). The majority of the Russian population depended directly on the efficiency of their farming. The economy of the Russian Empire could be identified as

mainly a capitalist market economy, although one in which the state played a considerable role and in which peasant households themselves produced a large part of the food they consumed (Wheatcroft and Davies, 1994).

The main agricultural products of the Russian Empire were cereals, which accounted for about 90 percent of the total agricultural land of the country. Among the cereal crops rye and wheat dominated, totaling more than 60 percent of the total cereal crop area. Rye was cultivated mainly for the Russian peasants' own consumption, as they preferred to eat bread made from rye grain. However, wheat was considered the most valuable agricultural product at that time. From the last quarter of the nineteenth century, a wheat market developed that determined the activities of millions of Russian peasants. The development of Russian agriculture had been influenced mainly by the external cereal market. Between 1860 and 1900 the domestic cereal market doubled, while the production of cereals in the "productive" part of European Russia tripled, from 5 to 16 million tons. Thus cereal production in the "productive" zone outstripped the growth in domestic demand (Chelintsev, 1922). The volume of cereal production as an extensive type of crop was determined mainly by the area of the cultivated plots, thus farms with a larger area of arable land found themselves in a more favorable position. As the rural population of European Russia grew, the center of cereal production shifted to the south, where arable land was still in abundance. In the 1860s, the southern regions of European Russia produced 50 percent of exported cereals, and by the 1900s this had increased to 80 percent (Chelintsev, 1928).

In 1912–1913, total cereal production in the Russian Empire reached 70.9 million tons, including 50.5 million tons of grain produced in European Russia (Popov, 1925). By way of comparison, the same amount was produced 40 years later in the Soviet Union. In 1912–1913, about 16 percent of grain production in the country was exported to the world market. Cereal exports increased throughout the period: between 1899 and 1903 the country exported 7.9 million tons; between 1904 and 1908 exports reached 9.0 million tons; and between 1909 and 1913 the figure was 11.6 million tons. At this time Russia and the United States emerged as the major suppliers of grain to the rest of the world. The marketability of Russian grain production was 26 percent of total output, and, taking into account the domestic peasant market, reached 31.5 percent before World War I (*ibid.*). The marketability of grain was

higher on the manorial estates, reaching 47 percent of the total output. On the holdings of the middle and poor peasants the marketability of grain was only 14.7 percent of total output (Balzak, Vasyutin and Feigin, 1952).

There remains some controversy about this period of agricultural development in the Russian Empire. Most Soviet historians maintain the existence of a profound agrarian crisis in the Russian Empire in the twentieth century, while many Western experts argue that the last decades of the Russian Empire were relatively successful in terms of agricultural progress (Gatrell, 1986; Gregory, 1992). They point out that a reform initiated by Prime Minister Stolypin in 1906 led the country towards a market economy. The 1906 law gave all peasants the right to separate themselves from the commune and to sell their share of the communal land. However, the success of the reform launched by Stolypin (who was assassinated in 1911) is still disputed. Estimates of the number of households that had become independent of the communes by 1917 vary considerably, from 10 to 22 percent (Gatrell, 1986).

The main indicator of agricultural progress is the fact that per capita agricultural output grew at a positive rate and exceeded, although only slightly, the growth of the Russian population between the late 1880s and 1912–1913. According to Wheatcroft and Davies (1994), grain production grew by some 2.1 to 2.4 percent per annum, an increase of 0.5 to 0.8 percent per annum per head of total population, and this should be regarded as a long-term improvement in Russian farming. This gross grain production was achieved as a result of the increase in sown area and yield. During the early twentieth century a significant increase in the sown area can be observed, especially in comparison with the preceding decades. Yields also continued to grow, except during 1906 to 1910 when they fell. The more valuable wheat crop demonstrated greater growth.

At the end of the nineteenth century, average grain retention in the country (i.e., production minus net exports) reached only 0.38 tons (Wheatcroft, 1992). However, for the majority, even including the “middle peasants”, the produce from their land was insufficient to maintain a family above subsistence level. From an official investigation carried out in 1885 it emerged that in 46 provinces of European Russia more than half the peasantry lacked the 19 *puds* (0.3 tons) of bread necessary for a peasant household, and less than a fifth had a surplus above the 26 to 27 *puds* (0.42 to 0.44 tons) considered by the tsarist statistical agency as

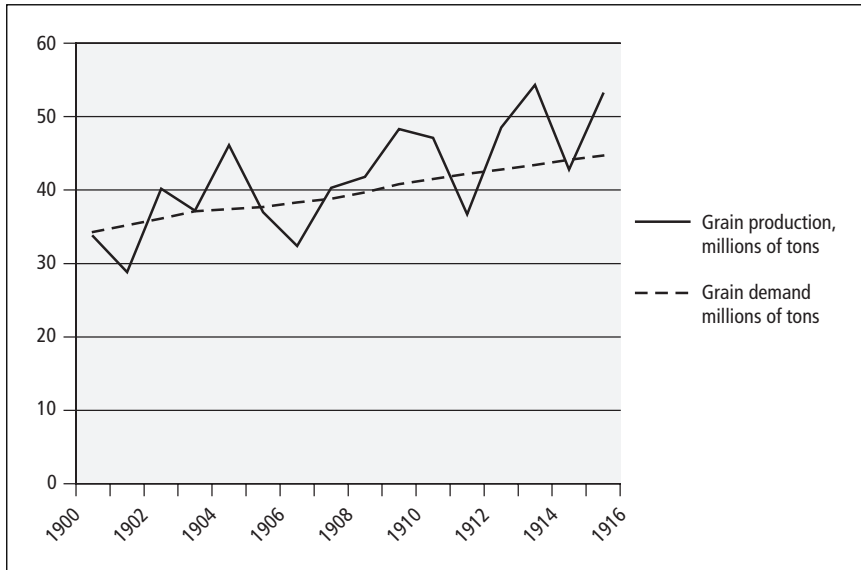
“truly adequate” (Dobb, 1966). Between 1895 and 1900, the average peasant consumed 0.39 tons of grain a year (Wheatcroft, 1992). According to the cereal balance for 1912–1913, on average one Russian peasant consumed about 0.24 tons of food grain (the official estimate of the norm for bread consumption), 0.1 tons of seed grain, and only 0.09 tons of grain for the feeding of livestock (Popov, 1925). Thus 0.43 tons of grain were available for a Russian peasant before the war.

However, this did not yet indicate continuous and stable progress in terms of grain production. The year 1912 saw an excellent harvest. In some good years in the past (for example 1894 and 1899), average levels of consumption had also reached 0.44 tons (Wheatcroft, 1992). Indeed, the “truly adequate” amount of grain reserve was not that much. Russian peasants traditionally limited amounts of grain for cattle feeding. The peasant’s diet was also very limited. In 1913, the average level of food consumption was still low, reaching only 2,109 kcal per capita per day, mostly due to insufficient consumption of meat and dairy products (Kisilev and Shagin, 1996). The level of food consumption was below the officially calculated Russian physiological norm (2,400 kcal).

We have estimated the grain balance based on official statistics for European Russia, which then included not only Russian provinces but also Belarus and the Ukraine¹. As most reports published only figures for food cereals (thus excluding winter barley and oats) we have calculated grain requirements assuming that 0.35 tons per capita was sufficient to cover the two basic demands—one for food (0.24 tons) and the other for seed grain (0.1 tons) (Popov, 1925). In some early reports (for 1900 to 1903), data on cereal crops include oats. To make these data comparable with later statistics we have to apply to the earlier data a correction coefficient of 0.8, which corresponds to the proportion of area under oat crop (20 percent) in European Russia in 1900 to 1903. Our estimate shows that in an average year a peasant could have a good surplus of grain (Figure 3.1.). Moreover, the grain balance shows some improvement during the period. Only in years of major droughts does grain production fall below the estimate for grain requirement. The balance looks favorable, but one should bear in mind the low level of peasant consumption mentioned above.

The remarkable growth of the Russian population was a crucial factor in the development of the Russian Empire at the turn of the century. Between the late 1880s and 1914, the Russian population increased by 52 percent (from 117.8 to 178.9 million) (*Statisticheskii ezhegodnik Rossii*:

Figure 3.1. Estimated grain balance in European Russia, 1900–1915



1915, 1916). According to Gatrell (1986), the total population of the Russian Empire (exclusive of Finland and the newly colonized Central Asian areas) between 1883 to 1887 and 1909 to 1913 grew at an average annual rate of 1.6 percent. This rate of growth was the highest in the history of the Russian Empire. The rate was exceeded only by countries with intensive migration, such as Australia, Canada, and the United States, but in Russia rapid population growth was entirely a function of natural increase. Indeed, Russia exported part of its growing population (3.35 million between 1890 and 1915).

The rapid growth of Russia's population took place due to the fact that the crude death rate was stable until the mid-1880s, after which it fell quite rapidly while the crude birth rate (that is, the number of recorded births per thousand people) remained very high. A Russian woman gave birth around nine times during her lifetime. Gatrell (1986) suggests that this demographic explosion was rather the result of steady progress in food consumption than medical and sanitary progress.

It appears a remarkable achievement for Russia that during this period the increase in gross grain production was indeed higher than the growth of the population. A more detailed analysis, however, shows that the growth in cereal production was not accompanied by a solution to

the key problems of Russian farming. Firstly, progress in yields was too slow in comparison with the potential productivity of Russian lands. Even by World War I, average cereal yields were still low—0.6 to 0.7 tons per hectare. The average yield in Russia was half that of European countries. This was mainly a result of low fertilizer applications. Before World War II, an average Russian peasant applied only 0.5 kilograms of mineral fertilizers (mostly imported) per hectare, while in Denmark the figure was 127 kilograms per hectare. The application of organic fertilizers (manure) was also insufficient. The poor treatment of arable lands was also connected with a shortage of draught livestock in many regions.

Another serious problem was connected with the limited reserves of new land available for ploughing. Statistics show that only the southern regions of so-called New Russia, the Urals, and Siberia, had some reserves of land for cultivation (Table 3.1.). However, even in these relatively scarcely populated regions, the rate of increase in the crop area was less than that of the population. Other regions of European Russia had no free land and faced problems of a shortage of arable land and rural overpopulation. In the Volga-Vyatka and Central Black Earth regions no growth in area of arable land was observed, although their population increased by 27 to 30 percent.

For an agricultural country, and moreover a grain-exporting country, Russia's population density was relatively high: at the end of the nineteenth century, European Russia, excluding Poland, had a population density of 53.5 per square mile as against 31 in the United States. Moreover, the proportion of the total land that was under cultivation was also relatively small, at no more than 25 percent, even in European Russia, compared to something like 40 percent in France and Germany. The result was that the average area of cultivated land per head of the agricultural population was only about 1.2 hectares, compared with about 5.2 hectares in the United States, 3.2 hectares in Denmark, and 1.6 hectares in France and Germany. As Dobb (1966) puts it, Russian agriculture combined the negative features of European agriculture (relatively small amounts of arable land) and of American agriculture (low yields).

The seasonal unemployment of Russian peasants was a crucial problem that stemmed from the unprecedented growth of the population. In the early 1890s, the number of peasants looking for seasonal jobs in towns and other regions of the country reached 6 million a year. By the end of the 1890s the number had increased 1.5-fold to 9 million

Table 3.1. Changes in crop area (thousands of hectares) and population (thousands) in the economic regions of the Russian Empire from 1904 to 1914

Region	Cereal crop area		Change %	Population		Change %	Crop area per capita, ha	
Year	1904	1914		1904	1914		1904	1914
European Russia	55,969	59,263	+6	106.0	133.9	+26	0.53	0.44
Northwest	993.4	994.3	0	5,421.3	6,688.5	+23	0.18	0.15
Central	3,595.8	3,458.6	−4	13,053.6	16,142.0	+24	0.28	0.21
Central Black Earth	5,669.3	5,631.5	0	11,499.0	13,078.6	+14	0.49	0.43
Middle Volga	6,099.1	6,377.6	+5	10,263.2	12,186.4	+19	0.59	0.52
Low Volga	5,606.7	6,380.9	+14	6,093	7,288.8	+20	0.92	0.87
Urals	4,622.5	5,151.2	+11	9,293.8	11,104.0	+19	0.49	0.46
North								
Caucasus	4,443.5	6,300.6	+41	4,365.0	5,574.9	+28	1.02	1.13
Siberia	2,466.0	4,264.0	+73	5,064.4	7,794.5	+54	0.49	0.55

Source: *Statisticheskii ezhegodnik Rossii:1904, 1905; Statisticheskii ezhegodnik Rossii:1914, 1915.*

in European Russia. Some experts suggest that the rural overpopulation of the Russian Empire had reached 20 to 25 million people by the end of the nineteenth century. In 1901, a special commission set up by the government of the Russian Empire following a wave of crop failures estimated that the rural overpopulation of the country had reached 23 million (Vilensky, 1980).

The most overpopulated regions of the Russian Empire were in the Black Earth belt of the Ukraine and Russia. Numerous methods were proposed for calculating the labor surplus in rural areas (see Maslov, 1930). For example, it was estimated that 4.32 hectares of agricultural land (including pastureland, hayfields and crop area) was sufficient for the full employment of one adult peasant throughout the year. According to this criterion, about 27 percent of the rural employable population of the Central Black Earth region were surplus to requirements by the late 1890s (Lubny–Gertsik, 1925).

One of the indicators of “land hunger” was that in the 1890s more than 42 percent of the peasants from the central agricultural regions had to rent agricultural land. The proportion of rented land reached 19

percent of the cultivated arable land and 30 percent of all agricultural land including pastureland. In fact, all plots available for rent were rented by peasants. One report (*Otchet IRGO za 1894, 1895*) stressed that the aim of the Russian peasants seemed to be to expand their areas of cultivation at any cost. The demand for arable land exceeded the supply of plots for rent. The report noted that the period of rental contracts was reduced (e.g. from one year to six months) while at the same time rents were increased by three to five times each time they were renewed during the 1890s.

The most overpopulated regions of the Russian Empire played a decisive role in the migration of peasants to Siberia and other peripheral regions. For example, peasants from the Central Black Earth region provided the majority of migrants in the 1890s (*Otchet Zapadnosibirskogo otdela IRGO za 1893, 1894*). The migration of the peasants, which was, to a degree, chaotic, resulted in a very high growth of the population in the regions of the Northern Caucasus, the Volga basin, and the Urals. The rapid expansion of arable land there was caused by this migration. The government adopted a state program for resettling peasants east of the Urals. Between 1896 and 1913, a total of 5.2 million people had resettled from European Russia to Siberia, the Far East, and Central Asia (Polyakov, 2000). The peak of the resettlement occurred during 1906 to 1914, when 4 million peasants migrated to the Siberian provinces. Many of them returned because of physical and economic hardship. Between 1907 and 1914, about one million Russian peasants returned to European Russia. The total number of migrants from European Russia reached approximately 5 percent of the population, while overpopulation was estimated at 16 percent. Thus the government program for the resettling of peasants from the most overpopulated regions of European Russia was not a great success. World War I virtually put an end to migration.

These most populated areas were also characterized by a very unstable political situation. From 1900 the demolition of estates as a form of peasant violence was most widespread in districts where, as in the Central Black Earth belt, land hunger was most pronounced. The peasant movement was much less prevalent in the non-black earth zone and in the north, where peasants found seasonal employment in urban areas. The situation was also stable in Siberia, a newly colonized area. In European Russia the peasant movement reached its maximum strength, engulfing, with varying degrees of force, 240 counties by the spring of

1906. After reaching its peak in the winter of 1905 and summer of 1906, the peasant movement, crushed by military force, began to subside, and during 1907 and 1908 only a relatively few outbreaks were recorded in rural areas (Lyashchenko, 1949).

Most experts saw the abolition of traditional cereal-oriented farming and the cultivation of more labor-intensive crops as an important solution to the problem of overpopulation (Chelintsev, 1922). In Russia, arable land was cultivated in accordance with the three-field system, in which one-third was planted in winter, one-third in spring, and the remainder left fallow in order for the soil to recover its moisture and fertility. Western Europe had already moved towards new rotations involving grass, clover, and legumes (pulses), but Russian agriculture retained a cereal monoculture. Indeed, the growth in numbers compelled the peasants to plough up precious pastureland, thereby exacerbating the problem of maintaining adequate livestock herds. This in turn had serious repercussions for the supply of manure and contributed to the failure to improve yields (Gatrell, 1986).

There were some indications that the adaptation of peasant farming to the shortage of arable land took place in European Russia between 1910 and 1914. According to research carried out by Chelintsev (1922), in the productive zone of the European part of Russia significant differences in the size of a farm's cultivated area were observed: in the southern regions the average size of a peasant's family plot was 10.97 hectares; in the north 5.44 hectares; and in the most populated regions 4.16 hectares. The proportion of area cultivated for potatoes, roots, and forage crops increased as the average size of the peasant's plot decreased. It was also noted that, due to the greater use of more intensive systems of agriculture, the income from one hectare of arable land increased from the southern regions (e.g., the Crimea) to the densely populated regions of the Ukraine—from 21 rubles to 55 rubles in the arable sector and from 8 or 9 rubles to 29 rubles in the livestock sector. On the whole, however, Chelintsev was obliged to acknowledge that the rate of this progressive transformation of land use was slower than the population growth of the central regions of European Russia. The use of grasses as part of improved rotations spread much more slowly among peasant farmers than on large estates. By 1916, grass represented less than 2 percent of all crops sown on peasant land, whereas the proportion was over 8 percent on large farms (Gatrell, 1986).

The destruction of traditional systems of farming was more dynamic in the northern and central (forest) regions of European Russia. In these regions the same “three-field” farming system for producing cereals (fallow, winter grain, and spring grain) had existed for almost three centuries. However, these regions traditionally depended on grain imports from southern (steppe and wooded steppe) regions. The local population of the region relied on different sources of income, including forestry, seasonal jobs in the cities, and handicrafts.

At the beginning of the twentieth century these regions faced significant changes. The intensive expansion of the railway network that connected the central regions with new agricultural lands in the south and east (and the Ukraine) opened up the possibility of transporting large amounts of cereal and other agricultural products from outlying areas to the center. Better access to cheaper grain was accompanied by falling prices for cereals in the center of the country. The price system of the local market became determined by the regions where production costs were lower than in the forest zone of the country. Almost all operations for producing cereal in the southern regions demanded less expenditure than in the central regions. The biggest difference in expenditure was in the application of organic fertilizers (manure). In 1912, the cost of fertilizer application per hectare reached 13.8 rubles in the central regions and 1.25 rubles in the Volga region. Finally, the cost of the production of one *pud* (16.5 kg) of rye grain in the central region was 98 kopecks as compared with 67 kopecks in the Volga region, while the retail price for rye reached 95 kopecks (*Tsentralny industrialny raion*, 1925). Thus the reduction of the cereal crop area by 6 percent in the central region took place for economic reasons. This process occurred in the last quarter of the nineteenth century, when the decline in the cereal crop area amounted to 15 percent in some administrative units of central Russia. By 1912, the process had already spread to all administrative units of the Central region. There is some evidence that the decrease in cereal-crop area was accompanied by a growth in the amount of arable land allocated for producing intensive food and feed crops to supply a growing urban population with vegetables and dairy products. Flax, a crop with a high market value, was also produced.

If any overall improvement in the development of Russian agriculture did take place, as many Western experts believe, the situation was quite different in the North and Central (forest) regions, the Black Earth belt, and the newly colonized regions of the south and east. Gross

grain production did increase in the south and southeast of European Russia and Siberia, but the Black Earth regions faced severe shortages of arable land while the northern half of the country had to compete with cheap bread coming from the southern regions. Thus the growth in production in the south tended to obscure the serious crisis that was taking place in the traditional farming areas in the center (Wheatcroft, 1992). On the eve of World War I there were some indications that Russian traditional agriculture was evolving towards more intensive farming of a Western type. However, the slowness of this change reveals the inability of the peasantry (still organized into communes) to make innovations.

The weak livestock sector in Russia was the result of an imbalance and the over-reliance on grain production in the Russian rural economy. One should also bear in mind that certain natural characteristics of the country meant that feed resources were limited in most regions (although in some regions there were highly productive meadows in river valleys).

There were two main reasons for keeping a herd—to produce meat and dairy products mainly for individual consumption, and to provide manure as an organic fertilizer. The poor podzolic soils of the forest zone could only produce a good harvest if fertilized with manure. Unfortunately, the number of cattle needed for productive farming never came near to the optimal level. In 1916 there were between 0.59 and 1.24 head of cattle per hectare of crop area in Russia, while the norm was 2.4 head per hectare for the traditional “three-field” system of farming (Lubny–Gertsik, 1925).

Supporting a large herd in Russia’s often severe climatic conditions required a large store of forage so that cattle could be kept in stalls during the winter season that lasted for 200 days (as opposed to 160 days for the European steppes). Russian peasants were not physically able to produce the necessary quantities of forage (straw and hay) to support large numbers of cattle during the winter. It seemed like a vicious circle. Any additional acres of arable land demanded the production of more and more forage for feeding cattle, and the moment came when the expense of keeping cattle as “manure-producing machines” made the whole venture unprofitable (Gatrell, 2000).

While in the forest zone the long and severe winter season made cattle-breeding very hard, in the wooded steppe and steppe landscapes of European Russia the race to produce a valuable market crop and pressure from a growing population, whose traditional diet was totally

based on bread, resulted in the rapid contraction of natural hayfields and pastureland during the nineteenth century. In the southern steppe region this shortage of pasture, and hence of livestock, resulted in an extreme shortage of manure, and it has been estimated that the amount of manure applied to the land was only about one-tenth of the traditional amount in East Germany (Dobb, 1966).

The Central Black Earth region, for example, was opened up for resettling by Russians in the mid-seventeenth century. By the end of the eighteenth century the region was still sparsely populated (8 to 9 persons per square kilometer). Large areas of virgin steppe still existed there, despite the fact that there was extensive utilization of the land resources, and each new plot of arable land was formed exclusively at the expense of virgin steppe. In Voronez province, for example, about 40 percent of the area was still covered by virgin steppe, used by peasants as hayfields. However, by the second half of the nineteenth century the province had become one of the most populated regions of European Russia. Correspondingly, the proportion of arable land increased dramatically. In Voronez province in 1870 the area of grassland reached 30 percent of the area of arable land; in 1887 it was 15 percent; in 1897 the proportion was 11 percent; and in 1917 only 5 percent. Most of the grasslands were dry, low-productive hayfields with numerous ravines. In the first decade of the twentieth century the Black Earth region was characterized as having the poorest feeding resources.

According to Russian agricultural experts, the best ratio of grassland to arable land is 1.24 (Milov, 2001). These 1.24 hectares of grassland provide sufficient fodder for the cattle that are needed to produce fertilizer for application on one hectare of arable land and as draught animals. An increase in grassland over arable land was observed only in the Northern and Northwestern regions. Most wooded steppe and steppe regions were characterized by totally inadequate areas of grassland, which resulted in the poor manure treatment of arable land. In the Black Earth region the ratio of grassland to arable land was one-tenth of the recommended figure (Table 3.2.).

A major part of the diet of Russian herds comprised roughage, straw, and hay. The proportion of these reached 85 percent of the total feed consumption. Feed grain available for cattle was negligible—0.09 tons per peasant or 1.8 to 2 *centners* per head of livestock per annum (0.5 kg per day). The feeding of Russian cattle during the winter was based mainly on straw that was characterized by being of very low nutri-

Table 3.2. The availability of grassland in European Russia in 1897

Regions and provinces	Area of grassland per one hectare of arable land	Regions and provinces	Area of grassland per one hectare of arable land
Northern		Kaluga	0.33
Arkhangel'sk	1.72	Tula	0.12
Vologda	2.55	Ryazan	0.26
Karelia	1.03	Orel	0.17
Northwestern		Central Black Earth	
Petersburg	1.15	Tambov	0.13
Novgorod	1.13	Kursk	0.11
Pskov	0.73	Voronez	0.15
Central		Volga	
Smolensk	0.59	Pensa	0.19
Moscow	0.67	Simbirsk	0.21
Vladimir	0.49	Saratov	0.19
Nizhy Novgorod	0.23	Urals	
Kostroma	0.60	Vyatka	0.24
Yaroslavl	0.87	Perm	0.73
Tver	0.89		

Source: calculated on the basis of work carried out by Lubny–Gertsik (1925).

ent value. The quality and quantity of feed was only sufficient to keep cattle more or less alive by the end of winter, even in an average year. In a bad year it was not uncommon for the straw from roofs to be fed the cattle and for more than a third of the cattle of the village to be slaughtered or sold due to the lack of adequate means to maintain them (Dobb, 1966).

Keeping one head of cattle in a stall required 12.8 centners of feed units (about 32 centners of hay if all feedstuffs are converted to hay equivalents of average quality) for 200 days of winter and 10.2 centners of feed units (about 25.5 centners of hay) for 160 days of cold season in steppe regions. However, the actual reserve was 3.2 to 6.5 centners of feed units (8 to 16 centners of hay) in Northern and Central regions, and less than 3.2 centners of feed units (less than 8 centners of hay) in the Central Black Earth region. To keep one head per day in a stall, about 6.5 kilograms of feed units (i.e., a little less than the current norm for feeding, which is 8 kg of feed units) were wasted. Real figures for the

daily diet of Russian cattle were 3 to 3.6 kilograms of feed units in forest regions and 1.8 to 2.0 kilograms of feed units in steppe regions. This level of feeding during the cold season could be qualified as a “semi-starvation” allowance (Lubny–Gertsik, 1925).

As both the population and the number of households grew, the shortage in feedstuff resources naturally worsened. The average number of working horses per peasant household worked out at less than one. The number of cattle per peasant household is estimated to have declined between 1870 and 1900 by 30 percent, the number of working horses per working male by a similar proportion, and the number per 1,000 hectares by 23 percent (Dobb, 1966).

The poor situation in the livestock sector is indicative of the problematic development of Russian agriculture in the pre-war period despite the remarkable growth in arable farming.

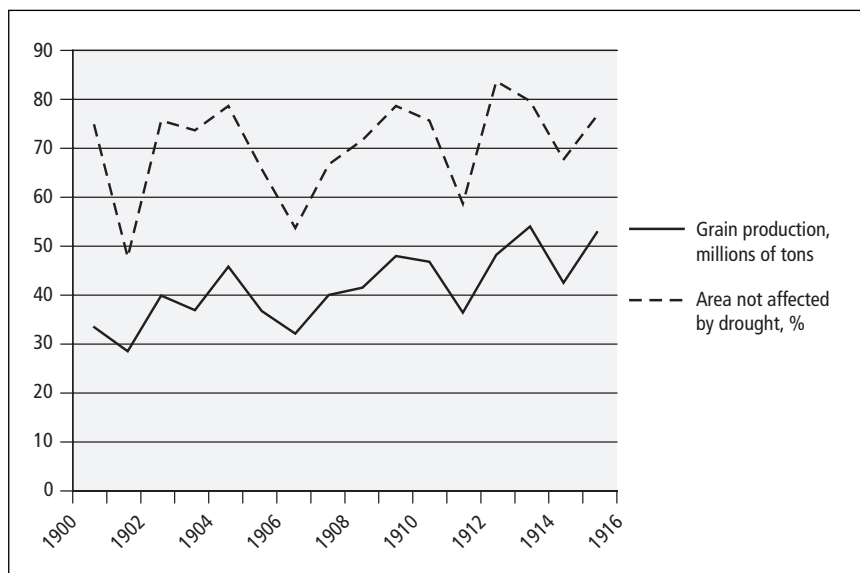
3.2. Weather variations and agricultural production

Climate was the most important factor in the fluctuations in gross grain production in the Russian Empire in the pre-revolutionary period. There is some discussion as to the degree to which the growth in grain production in the pre-war decade should be attributed to the Stolypin reform, which began in 1906, or to the favorable weather conditions.

Gatrell (1986) agrees that grain production certainly rose substantially in the last 20 years before World War I (Figure. 3.1.). However, he does not share the position adopted by many historians, who claim that it was the Stolypin reforms that led to the dramatic increase in agricultural, and particularly grain, production between 1909 and 1913. He points out that this assumption appears doubtful in view of the very large role played by the weather. For example, the very high level of grain production in the single year 1913 was certainly due to exceptionally good weather.

Wheatcroft (1994) constructed a “drought index” from data for 1883 to 1915, which assesses how far annual fluctuations in the degree of drought in late spring and early summer might be expected to affect grain yields. To reconstruct the potential yield, the author extrapolates the actual 1883 to 1915 trend of yield linearly to 1940. Then, for six geographically remote locations, for 1883 to 1915, the yield is correlated with mean temperature and rainfall during certain critical months. The “weather index” thus derived is further used to predict agro-meteoro-

Figure 3.2. Gross grain production and scale of drought in European Russia, 1900–1915



Source: *Statisticheskie ezhegodniki Rossii*, various years.

logical deviations (i.e., deviations due to good or bad weather) from yield trend. Where the actual deviation is significantly larger than the predicted deviation (from the weather-related yield trend), the strong influence of political factors is suggested. According to the author, the weather was largely responsible for the above-average yields over the whole five-year period between 1909 and 1913, not just in the bumper harvest year 1913. It could be concluded from these calculations that relatively low harvests between 1904 and 1908 were 60 percent determined by bad weather, and the very good ones between 1909 and 1913 were 80 percent due to favorable weather.

While the role of agricultural reforms and weather in the progress of grain production before the war is still the subject of discussion,³ it is certain that all crop failures in this period were caused by dry weather. Figure 3.2. shows a good correlation between grain production and the scale of droughts in European Russia in the pre-war period. The scale of drought is calculated as a proportion of the crop area not affected by drought, on the basis of a drought index or the Hydrothermal Coefficient (HTC) proposed by Seljaninov (1966)⁴. The index was calculated

only for the main agricultural regions of Russia, located mostly in steppe and forest steppe zones. This means that even in a good year a certain proportion of the zone (about 20 percent) is characterized as being in a dry condition (e.g. along the Caspian Sea coast). A large-scale drought occurred when dry weather covered more than 40 percent of the area of the agricultural zone (conversely, less than 60 percent of the area is not affected by drought, as shown in Figure 3.2).

On the whole, this period looks very favorable in terms of weather. Wet weather (with 80 percent of crop area not affected by drought) prevailed during the whole period. Climatic conditions show some improvement in the course of the period, and the grain harvest also shows a slight improvement. In only 3 out of 20 years (the last crop failure in the nineteenth century occurred in 1897) did a large-scale drought occur in the agricultural zone of European Russia. These droughts were evidently responsible for the three largest crop failures in the Russian Empire in the nineteenth and twentieth centuries (Figure 3.2.).

This period is relatively well covered in terms of official statistics on agricultural production. The cereal yields in major regions of the Russian Empire in years of drought (including the largest drought of 1891) are shown in Table 3.3. The statistics show that grain yields in some key regions of Russia fell considerably in the three years 1901, 1906, and 1911, as compared with the average harvest figures for 1900 to 1911. Additionally, data for the worst drought in Russian history, which occurred in 1891, are included in the table.

Weather data for the period are scarce. Fortunately, in 1933 the Central Administration of the Unified Hydrometeorological Service of the USSR (TsUEG) published a special report with a synoptic analysis of major (or, as the report called them, “catastrophic”) droughts in the last 40 years in Russia. The list of catastrophic droughts includes those that occurred in 1891, 1897, 1901, 1906, and 1911 (*Opyt predvaritelnogo analiza*, 1933). We have also constructed maps for 1901, 1906, and 1911, to show the possible proportion of regions (oblasts) affected by drought in May to July. The map is based on the drought index proposed by Seljaninov (1966). All these maps have been drawn up according to the modern administrative division of the Russian Federation.

In 1901, gross grain production in European Russia (including the Ukraine) fell by only 10 percent from average levels (as opposed to a fall of 35 percent in 1891). However, the spring crop production was 14 percent lower than average. An official statistical yearbook (*Statisticheskie*

Table 3.3. Cereal yields in the major regions of the Russian Empire in drought years (centners per ha)

Region	1891	1901	1906	1911	1900–1911
European Russia	4.3	6.0	5.7	6.3	6.7
Central	5.9	6.7	5.3	8.2	7.0
Central Black Earth	3.8	6.3	6.4	8.1	7.3
Middle Volga	3.1	4.7	3.6	4.6	6.6
Low Volga	1.5	2.7	2.8	0.5	4.7
Urals	4.2	4.5	2.9	1.9	6.4
Northern Caucasus	No data	7.6	8.0	6.6	6.7
Ukraine	10.2	10.9	10.9	9.6	8.6
Western Siberia	No data	3.6	8.3	5.4	7.0

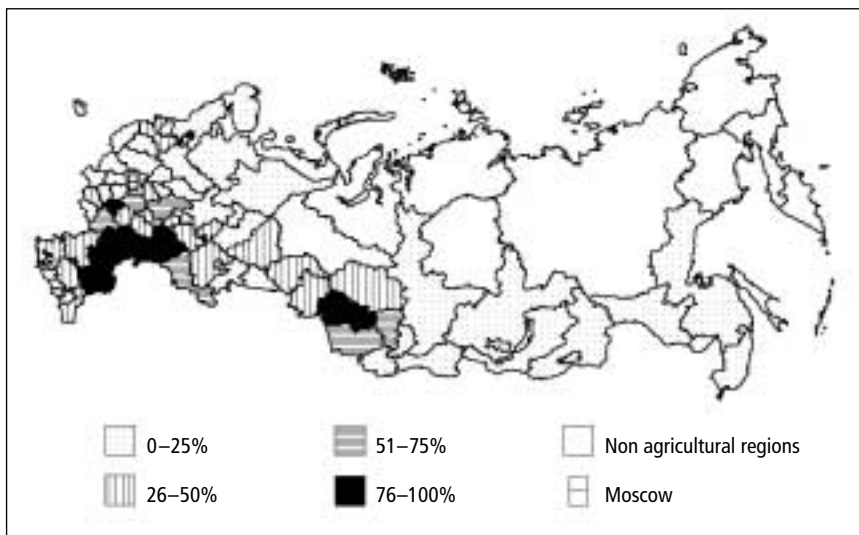
Source: *Statisticheskie ezhegodniki Rossii*, various years.

ezhegodniki Rossii: 1901, 1902) described this year as “a very poor year” for Russia. The report stressed that drought was the major cause of the crop failure. The report named the most drought-affected regions as the Low Volga (with a 40 percent fall), the Middle Volga (a 30 percent fall) and the Urals (36 percent fall). The Siberian provinces saw an unprecedented 52 percent decline in grain production. Fortunately, the Northern Caucasus and the Ukraine produced bigger than usual harvests.

The report by the TsUEG (*Opyt predvaritelnogo analiza*, 1933) said that adverse weather conditions had already occurred in the autumn of 1900. In many regions no rain fell in August and September, causing peasants to sow the winter cereal too late (in mid-October). As a result, in the Middle and Low Volga regions fields sown with winter cereals faced the winter without any young growth. Thus, the report said, the crop failure in the Volga basin was to be attributed partly to the dry autumn of 1900, as in some districts less than 10 millimeters of rain fell. In addition, the southern part of European Russia faced an unusually warm December and by 1 January 1901 there was still no snow cover.

In 1901, there was a severe drought in June and many districts of the Middle and Low Volga and the eastern part of the Central Black Earth region were affected (in Voronezhskaya and Tambovskaya provinces the harvest fell below average levels by 15 and 27 percent respectively). In these regions only 5 millimeters of rain fell during the whole month. The Astrakhan, Volgograd, and Ul'yanovsk (then Simbirskaya) oblasts did not see any rain this month at all, which resulted in

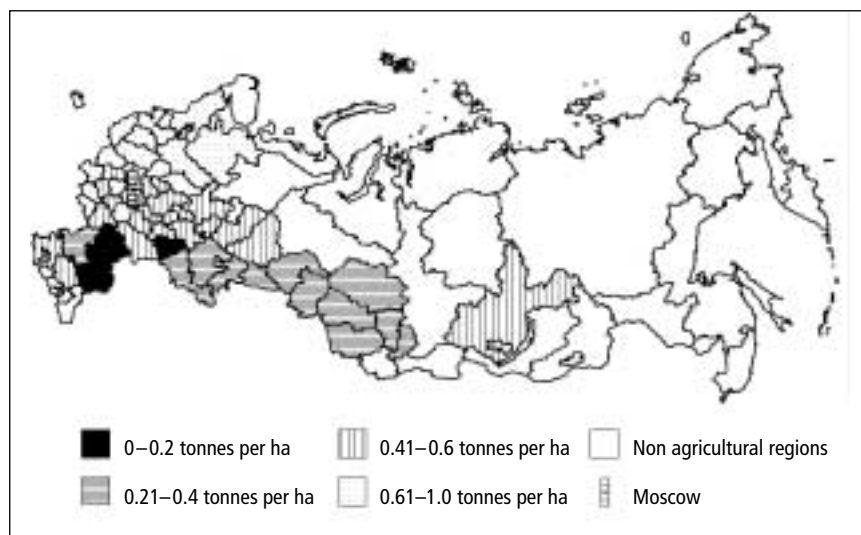
Figure 3.3. Area affected by drought in 1901



a reduction in the harvest of 40 to 50 percent. The map based on the calculation of the drought index reflects this situation for the early summer of 1901 (Figure 3.3.). It was reported that, besides the drought, strong dry winds (*sukhovei*) affected cereal crops in many districts of the Volga basin, where cereal yields were less than 0.2 tons per hectare, which was about the amount of seed grain sown by the peasants (Figure 3.4.). There, soils were reported to be so dry that the surface was cracked in many places. Most small rivers and shallow lakes in the region dried up. Flooded meadows in river valleys gave very poor harvests of hay. From early July the anticyclone shifted to the east in Siberia, where dry and hot weather inevitably affected crops very badly. For example, the badly affected province of Tomskaya experienced a fall in grain production of 58 percent.

At that time, most territories of European Russia enjoyed wet weather, which partly improved the harvest in central Russia. In August the dry weather returned to European Russia and numerous forest fires were reported in the northern regions. This new drought helps to explain the fact that the area of low yield considerably exceeded the calculated area of the drought in May to July of 1901. The arctic air mass spreading from the northeast to the southwest played a major role in the development of a large-scale drought in June and August of 1901.

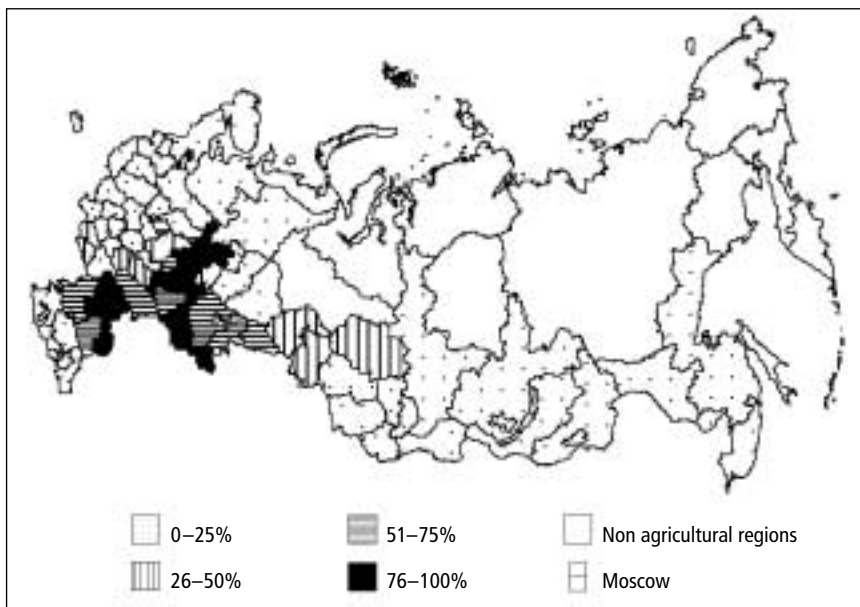
Figure 3.4. Cereal yield in 1901



The report (*Opyt predvaritelnogo analiza*, 1933) also stresses that the unusual dry and hot weather of 1901 was observed not only in Russia but also in many other parts of the moderate climatic zone of the northern hemisphere. Information about abnormal heat in June and July is also to be found in Western Europe, including the United Kingdom. Very hot weather was also experienced in the United States. In some countries high temperatures had catastrophic consequences. In Paris, for example, there were numerous cases of heatstroke. On 1 July, in New York, 183 cases of heatstroke were registered and 87 people died. On 3 July, 200 deaths were registered in the city. It was reported that in late July a new heat wave killed crops in the western United States, resulting in losses of 300 million dollars.

The next drought, in 1906, was the most severe in the pre-war decades of the Russian Empire. The gross cereal production of European Russia dropped by 15 percent from the average (as opposed to 7 percent in 1901, although the total grain production in 1906 was higher, evidently due to there being a larger crop area under cultivation). There were poor harvests in many consumption and production regions of the Russian Empire, including the Central Industrial and Central Black Earth regions, the Urals, and the Middle Volga and Low Volga regions. The latter three regions were most affected, with harvests falling by 40 to 50 percent compared with the average (Table. 3.3.).

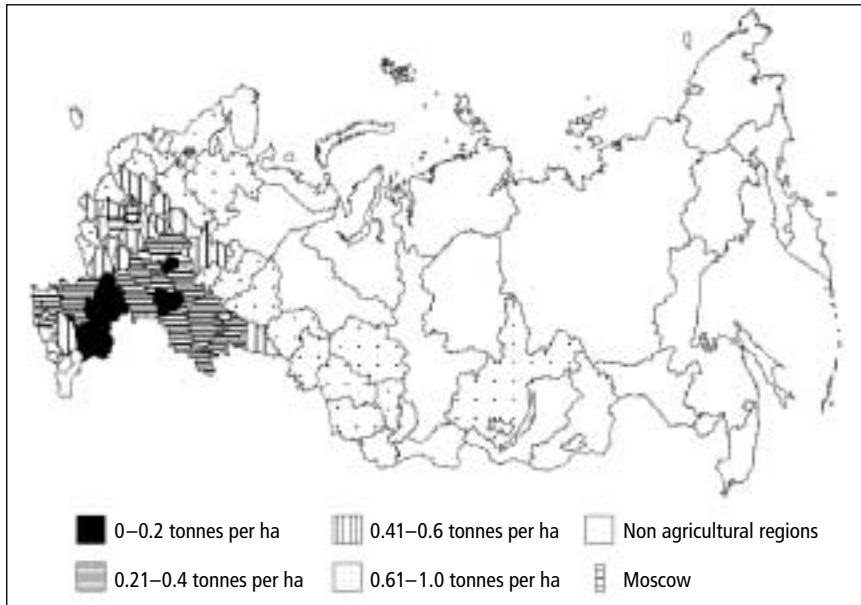
Figure 3.5. Area affected by drought in 1906



According to the TsUEG report (*Opyt predvaritel'nogo analiza*, 1933), the drought of 1906 began as early as the beginning of April, and lasted for 20 days. It covered a large area, including the Northern, Northwestern, Central, and Central Black Earth regions, some districts of the Volga-Vyatka, western districts of the Urals, the Volga, and the Northern Caucasus. The report also notes that the autumn of 1905 was, fortunately, wet. The winter was snowy everywhere in European Russia, and the month of March 1906 was also very favorable climatically. Thus extremely large amounts of moisture in the soil helped winter crops to survive in the regions which suffered during the dry April. However, the report said that in some places in the Central Black Earth region, and the Middle and Low Volga winter crops were damaged by the strong dry winds in the spring.

In May, the Siberian anticyclone affected the eastern part of European Russia, bringing dry and hot weather. However, the total area affected by this drought was smaller than in April. The drought covered mainly the Volga basin, the Don basin (Rostov province), the Urals, and Volga-Vyatka (Figure 3.5.). In these regions the drought lasted for two weeks in May. It destroyed the winter crop completely and damaged the

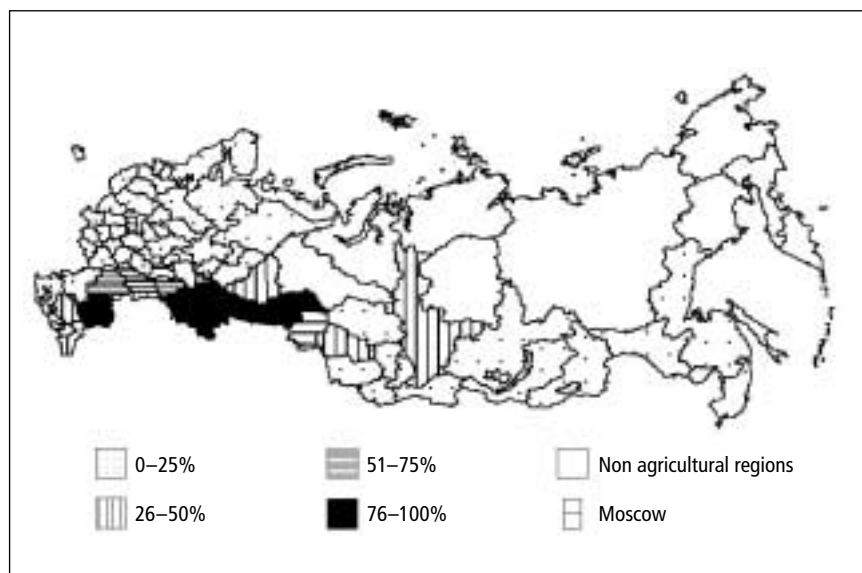
Figure 3.6. Cereal yield in 1906



spring crop in many areas. In June, dry weather only occurred in the Low and Middle Volga and the Don basin. In the Volga region peasants had to use winter and spring cereals to feed their livestock because of the low crop quality. In contrast, in western and central parts of European Russia, after 20 June the weather became extremely rainy with numerous storms. It was reported that “tens of thousands” of hectares of crops and orchards were damaged by hail, strong winds, and flooding. The Russian papers published a lot of information about catastrophic rainfall and hail in July. This unstable rainy and stormy weather was responsible for the relatively low harvests in central and northern regions of European Russia, rather than the early spring drought mentioned above (Figure 3.6.).

The drought of 1911 was not as intense as that of 1906. The cereal harvest in European Russia was only 6 percent lower than average. The drought of 1911 mostly affected a compact but extensive area spreading from the Volga basin and the southern Urals to the southern part of Western Siberia. In this area crop failure was catastrophic (Table.3.3.). Unlike the situation in 1901 and 1906, this drought appears to have been caused by a single climatic factor determining the geographical

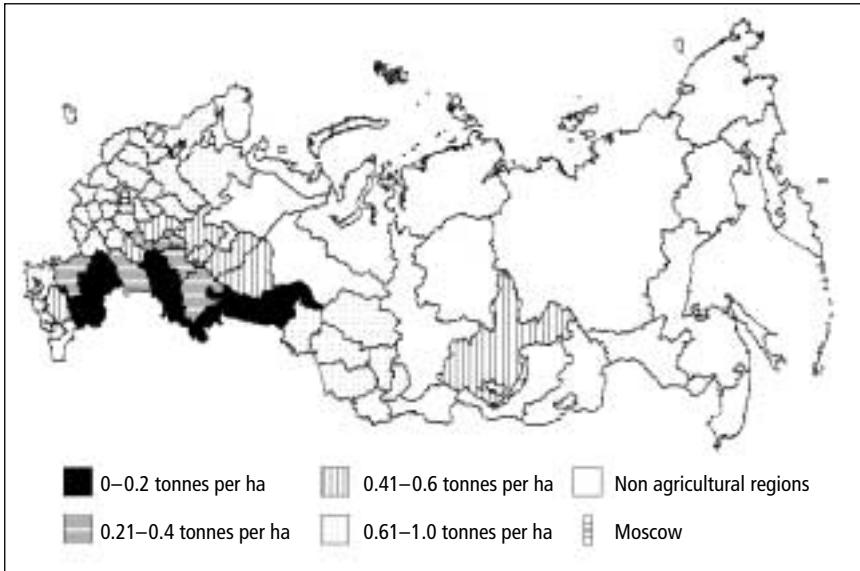
Figure 3.7. Area affected by drought in 1911



extent of the poor harvest. This can be seen from the remarkable similarity between Figures 3.7. and 3.8.

The TsUEG report describes the situation in 1911 in the following way. The spring was characterized by a very active cyclone in the north of European Russia and by the presence of a very stable anticyclone in the middle and southern regions of Western Siberia and in the basins of some Siberian rivers (the Tobol, Ishim, and Irtysh). The anticyclone also affected the Urals (the basins of the rivers Ural, Belaya, and Ufa) and the Volga region, which resulted in a precipitation deficit. This disposition of regional synoptic processes remained during May and June. To the east of the Volga river a lack of rain was observed until late July. Thus between April and late July a vast territory covering the southern part of Western Siberia, the Urals, and the Low and Middle Volga suffered from drought due to the Asiatic anticyclone. As a result, by the beginning of July cereals and grass had been damaged by heat over the majority of the territory. Moreover, in the southwestern part of Siberia the drought affected spring cereals and followed the severe winter of 1910–1911, which had damaged winter crops. In Tobolskaya province the grain harvest reached only 20 percent of the average level (*Statisticheskii ezhegodnik Rossii: 1914, 1912*). Other provinces in Siberia suffered less.

Figure 3.8. Cereal yield in 1911



The report also says that many areas of the Ukraine and the Central Black Earth region had excellent harvests, although they suffered somewhat from rainy weather in the autumn.

3.3. Food problems

There is some contention about the scale of the food crisis in the drought years in pre-war Russia. Soviet experts believe that mass famine occurred because of the droughts. They inevitably quote the words once articulated by V. Lenin about famine occurring in drought years in pre-revolutionary Russia. Quite typically, one Soviet news agency (*Voskresensky*, 1982), when discussing agricultural development in pre-revolutionary times, claimed that mass famine occurred in Russia in 1911. According to this agency, this year mass famine was observed in 60 out of the 70 provinces of the Russian Empire, and more than 30 million peasants (20 percent of the total population) starved. The blame was laid on the tsarist regime, which had urged for increases in cereal exports at any cost. Soviet historians generally quoted the words of Vyshnegradsky, the minister of finance, who said in 1887: “Let us starve, but let us export.”

Some Western experts also talk of mass famine in the years of crop failure at the beginning of the twentieth century. Gregory (1992), for example, says that the terrible famine of 1891 was followed by famine in 1897 and 1901 (p. 11). Similarly, Conquest (2002) says that before the revolution of 1917 “there had been famines in Russia—in 1891, in 1906, in 1911” (p. 56). However, other Western experts believe that the Russian Empire managed to avoid mass famine in the years of crop failure due to general improvements in agriculture and in the Russian grain market. Gatrell (1986) says that, although in 1901, 1906, and 1911 the harvest failed in European Russia, the increased importance of the Ukraine and, subsequently, of Siberia, prevented the harvest failures in the center from becoming natural disasters. He claims that the 1891 crop failure was the last in pre-revolutionary Russia to be regarded as “famine” (p. 140).

His position appears reasonable. The famine of 1891 is a well-known disaster in Russian history but there is no evidence that a similarly profound food crisis struck in any other year of drought subsequently. It is worth discussing the main reasons for the disaster of 1891 and for the absence of mass famine in 1901, 1906, or 1911.

The first reason is evident—the drought of 1891 was much more severe than any other in the pre-war period. It was an unprecedented and severe climatic phenomenon and affected a vast territory—the Middle and Low Volga, almost the whole of the Central Black Earth region, the southwest and northeast of the Volga-Vyatka region, the Northern Caucasus, the Crimea, and southwest Ukraine. It was reported that the drought also affected some central and northern regions of European Russia—the southeast part of the Central region, central districts of the Western region, and Belarus (*Opyt predvaritelnogo analiza*, 1933).

In 1891 there was a combination of spring drought and other vagaries of the weather. Problems had already emerged in the autumn of 1890 and winter of 1890–1891. According to information from the Department of Agriculture of the Russian Empire, the winter crop of the Central Black Earth region was damaged due to an unusually dry autumn in 1890. In addition, the winter of 1890–1891 was extremely cold. In early December there were 31 degrees of frost in the Central region of Russia and 36 degrees to the northeast of Moscow. Severe frost accompanied by strong winds swept away snow from the soil surface and in many districts it remained uncovered for many weeks. Accord-

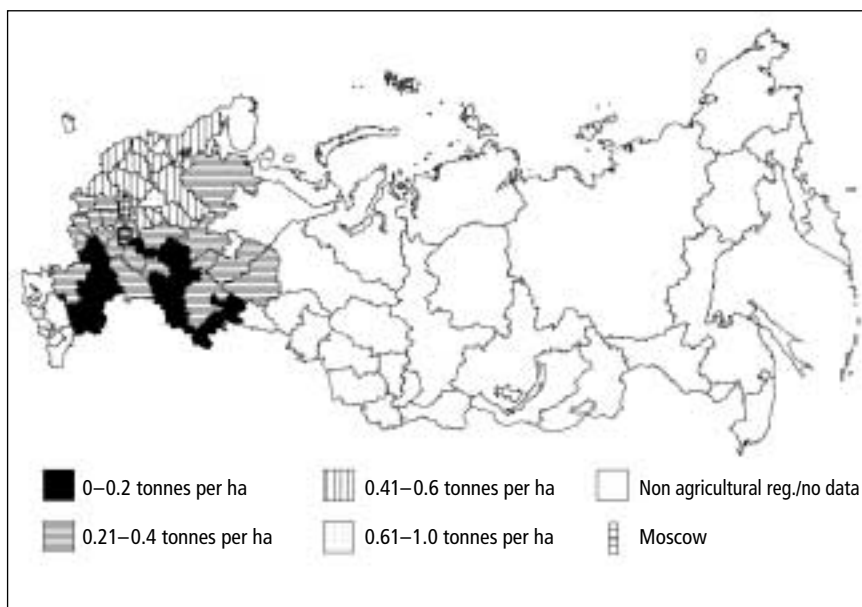
ing to the TsUEG report, this was the most severe winter in Europe in the whole of the nineteenth century. It was reported that in 1890–1891, unusually cold weather spread to western Europe and even North Africa. For example, temperatures in Madrid fell to minus 7.5 degrees, and a temperature of minus 9 was registered in the city of Algeria.

In spring the thin snow layer melted in a few days providing little moisture for the soil. Up until mid-June, the dry and warm weather was interrupted several times by returning frosts which damaged the weak winter crop and prevented the sowing of spring cereals. The main area affected by the spring/summer drought spread from the Crimea to the middle and lower reaches of the rivers Don and Donets (eastern Ukraine, and Rostovskaya and Volgogradskaya oblasts), the southern part of the Volga basin (south of the city of Saratov), to the basin of the river Ural (Orenburgskaya oblast). In the Central Black Earth region great damage was caused to crops by the strong dry winds (*sukhovei*) which brought temperatures higher than 40 degrees and reduced the moisture in the air to below 20 percent. In European Russia precipitation reached only 44 percent of average levels during the first half of the year. The drought was initially associated with the influx of arctic air, which was transformed into a dry and hot mass.

The combination of the different climatic factors explains the enormous area of crop failure in 1891. Statistics show that in 1891 cereal yields elsewhere in European Russia were below average levels (0.7 to 0.9 tons) (Figure 3.9.). In the Volga, the Central Black Earth region and the Urals, the drought and dry winds completely destroyed the crops. The rest of the territory suffered from a severe winter followed by the dry autumn of 1890. The area of crop failure in 1891 was much larger than in any other drought year in the pre-war period. This emphasizes the unprecedented character of the natural disaster. The crop failure reached 25 percent of average levels of grain production between 1886 and 1890, and 35 percent of the levels of 1900 to 1911 (Table.3.3.).

Besides extremely unfavorable weather conditions in 1891, there were certain social and economic factors that were responsible for the emergence of mass famine that year in European Russia. Wheatcroft (1992) provides a detailed analysis of the economic situation in 1891. He points out that the growth in grain production in the last 20 years of the nineteenth century was indeed sufficiently rapid to provide for the large growth in population and in grain exports. However, in individual years, and also in clusters of years, levels did fall quite sharply. The

Figure 3.9. Cereal yield in 1891



famine of 1891 was primarily the result of a decline in grain yield resulting from a drought, but it followed a series of poor yield years—1890, and especially 1889, when grain production per capita was less than the officially estimated minimum at 0.3 tons of bread (Table 3.4.).

Considering that the level of grain production in the famine year of 1891 was higher than in 1889, Wheatcroft (1992) raises a reasonable question: Why did the famine occur in 1891 and not in 1889? To some extent this can be explained by the fact that the peasants had greater reserves in 1889, which were exhausted by 1891. But it is also likely to be related to two other factors: the sharp decline in the living standards of part of the peasant population in 1891, with a deterioration in rural wage rates and an increase in peasant indebtedness; and the regional incidence of harvest failure.

The geography of the crop failure seems to be the most important factor in the mass famine in 1891. Grain production in 1889 was particularly low in the relatively wealthier southern regions that had a large surplus of grain in average years (the Ukraine and Northern Caucasus) but was high in more overpopulated regions—the Central Black Earth and Volga regions. In 1891 the drought affected the Volga and Central

Table 3.4. Grain production, exports, and domestic residue per head of the population in the 50 provinces of European Russia, 1883–1900 (millions of tons and tons per capita per annum)

Year	Production	Exports	Net	Population	Per capita production	Per capita net exports
1883	33.95	5.24	28.71	76.85	0.44	0.37
1884	37.32	5.63	31.69	77.81	0.48	0.41
1885	31.67	4.55	27.12	79.11	0.40	0.34
1886	35.87	6.44	29.43	80.21	0.45	0.37
1887	41.69	898	32.71	81.47	0.51	0.40
1888	40.15	7.63	32.52	82.72	0.49	0.39
1889	30.48	6.85	23.63	84.18	0.36	0.28
1890	36.86	6.40	30.46	85.28	0.43	0.36
1891	28.76	3.21	25.55	86.48	0.33	0.30
1892	34.46	6.62	27.84	87.68	0.39	0.32
1893	48.03	10.48	37.55	88.10	0.55	0.43
1894	48.65	9.42	39.23	89.34	0.54	0.44
1895	43.79	8.30	35.49	90.65	0.48	0.39
1896	44.66	8.01	36.65	91.94	0.49	0.40
1897	37.07	7.52	29.55	93.78	0.40	0.32
1898	43.07	5.67	37.40	95.16	0.45	0.39
1899	49.54	6.88	42.66	96.63	0.51	0.44
1900	48.32	7.64	40.68	98.38	0.49	0.41

Source: Wheatcroft (1992).

Black Earth regions while grain production remained fairly high in the south. The wealthier southern provinces were able to withstand the poor harvest of 1889 with only a limited reduction in exports, but the decline in the most populated central provinces in 1891 was much more serious. These central production areas are the ones which became the main victims of the drought of 1891. These regions had traditionally supplied grain surpluses to the northern cities, although more recently these traditional production regions had been superseded by the Ukraine and Northern Caucasus as major grain surplus producing provinces. These southern surplus regions were the source of the largest grain exports of this period due to their easy access to the Black Sea. Thus the central production regions were already undergoing a decline in comparison with the newer and more prosperous southern regions.

Wheatcroft (1992) discusses which regions and which groups of the Russian population were the most vulnerable to crop failure. A fall in grain production did not necessarily lead to a decline in all peasant living standards; when grain prices rose, those peasants who were able to maintain control over their grain surpluses could end up with a higher income. Peasants who had no surpluses and who depended on the market for their own food would be the most affected by the grain shortage and the rising prices. In the northern (consumption) area, poor peasants who produced insufficient grain for their own consumption had greater prospects of industrial urban or forestry employment to supplement their incomes. In the south, the predominant means of supplementing income was to seek employment as a seasonal agricultural laborer. The problem was particularly severe here because the drought not only caused grain prices to rise, it also tended to lead to a fall in rural wages and a reduction in rural work prospects, since less labor was required to bring in the smaller harvests. It was within this group of rural wage laborers that the effect of the drought and the famine was most severe.

The crop failure caused a steep rise in grain prices in 1891 and 1892. The price of rye, for example, more than doubled, from 28.6 rubles per ton to 58.6 rubles per ton between 1882 and 1890. The problem was that this rise was accompanied by a decline in rural wages, which resulted in a sharp fall in real rural wage levels. Detailed figures for different regions indicate that the crisis was far more serious in the traditional agricultural regions than in the northern areas closer to the industrial zone. Data on peasant indebtedness and indirect tax payments also demonstrate the serious nature of the peasant crisis. Rural tax indebtedness was particularly high in the central regions, and was actually rising during the famine when indirect taxation payments were falling. The poor economic condition of the peasants was the main reason for the mass famine in the central agricultural regions.

In addition to the famine, an epidemic of cholera broke out among the peasants in the Volga region, where the drought was the most severe. Wheatcroft (1992) refers to a work of Robbins, who calculated that the average death rate in the 16 provinces of European Russia most severely affected by the famine rose from 3.76 percent (the norm for the period 1881 to 1890) to 4.81 percent in 1892. In absolute figures, the number of deaths in the famine-stricken provinces during 1892 was about 406,000 above normal. The number of cholera deaths is estimated at 103,364. Thus about 25 percent of the excessive mortality could be

Table 3.5. Child mortality in peasant families in Voronez province

Group of farms	Child mortality, %
No arable land	21.7
1–5 hectares	21.3
5–15 hectares	18.7
12–25 hectares	16.8
over 25 hectares	14.9

Source: Polyakov, 2000.

attributed to the cholera epidemic, although a sizeable proportion of the cholera deaths were undoubtedly famine linked. The final estimate of the number of deaths occurring as a direct consequence of the mass famine ranges from 375,000 to 400,000. This clearly indicates that the level of excess mortality was significant and that it was concentrated in the Volga and the central agricultural regions. Robbins also pointed out long ago that the tsarist famine relief measures were remarkably good. This last conclusion contradicted the widespread opinion then held in Russian society (and later by Soviet experts) concerning the ineffective policy of the tsarist regime during the disaster.

The present authors regard as correct the analysis made by Wheatcroft. As mentioned above, agricultural performance differed greatly in different regions of the Russian Empire. Some of them showed a good rate of development but others suffered greatly from overpopulation and unemployment. These most vulnerable regions were the traditional agricultural regions of the Black Earth belt. In some of these regions the proportion of a peasant family's budget represented by employment was as much as 59 percent of total income (Orlovskaya province) (Popov, 1925). The most vulnerable group of the population comprised those Russian peasants who possessed only a small plot or had no arable land. The more acres of arable land a peasant owned, the higher his standard of living. Another indicator of the well-being of peasant families was child mortality. In Voronez province (in the Black Earth region) the link between the size of agricultural plot and the rate of child mortality for this period is shown in Table 3.5. In peasant families that possessed a relatively large plot the child mortality rate was one-third less than landless peasant families.

How different was the situation in drought years in the two pre-war decades? On the whole, the situation had improved in terms of the phys-

ical and economic access of Russian peasants from the affected regions to surplus grain produced in wealthier regions. The government encouraged production and also facilitated the marketing of what was harvested. It subsidized the construction of a nationwide railway network. This rail network ensured that, in principle, grain and other supplies could be moved quickly and easily from areas of surplus to areas of deficit. In the late nineteenth century a tariff system was introduced on the Russian railway in such a way as to encourage grain exports to Western Europe. The cost of grain transportation to major sea ports and the western borders was considerably lower than in any other direction. This prevented regions that had suffered a poor harvest from being supplied with cheap grain. In some regions, rivers were used to transport grain. In the course of the famine of 1891 the Russian government revised the tariff system and ordered cheap tariffs regardless of the direction of transportation (Voeikov, 1963).

Many experts also stress the importance of the rapid development of Siberia as a buffer grain producer in poor years. Agricultural development in western Siberia appears to have been carried out largely on the basis of freeholdings, much as in Western Europe. With the construction of the Trans-Siberian railway during the late 1890s, the potential Siberian grain surplus could be sent westwards. In average years strong competition emerged in the grain markets of European Russia and Siberia. As Gatrell put it, “The railway turned into a nightmare for Russian landowners in the central provinces of European Russia” (1994). This statement is apparently generally correct, and the worst year for European Russia was 1906 when the Siberian provinces produced an excellent harvest. In 1901 and 1911 Siberia faced a shortage of grain itself (see Table 3.3.). The Ukraine played a more important role as it provided the largest grain surplus in the Russian Empire.

The most obvious reason for the easier food situation in the country was that the crop failure in any unfavorable year of the pre-war decades was considerably less than in 1891. In European Russia the yields fell by 35 percent, while in the poorest pre-war drought of 1906 the figure was 15 percent (see Table 3.3.). In 1891, the three major productive regions—the Central Black Earth region, Middle Volga, and Low Volga—faced catastrophically low harvests. In the Central Black Earth region the yield was less than 0.4 tons per hectare. In fact, in many districts of the region peasants had nothing to harvest, nor was there any prospect of the peasants finding work on the estates. Fortunately, in the

bad years of the pre-war decades the average yields in the Central Black Earth region were higher. According to official statistics, in 1901 yields reached 0.63 tons per hectare, in 1906 they reached 0.64, while in 1911 the figure was 0.81. The last figure is even higher than the average harvest (0.73 tons) from 1900 to 1911. Thus the situation in this region should have been much better than in 1891. The local peasants could be employed on the agricultural farms within the region as well as outside. Also, in the Middle Volga and Low Volga regions yields were higher, though only slightly, than in 1891.

There is no historical evidence that a food crisis similar to the famine of 1891 occurred in any part of European Russia between 1900 and 1916, although some food problems certainly could have existed in some regions of Russia. Unfortunately, Russian official reports contain no statistics on food consumption in the regions for a given year, while other statistical data are not easy to interpret in the context of food problems.

There were attempts to find a correlation between harvest and mortality but the results are far from certain. Zaitsev, writing in 1927, showed that mortality among the Russian population for five years in particular stands out from the period 1873 to 1913. In these five years—1872, 1882, 1892, 1895, and 1910—the crude death rate in European Russia was 7 percent above the trend line that he had plotted. In 1882 it was 12 percent above the trend and in 1892 it leapt to 27 percent. However, in the last 25 years of tsarism the harvest failed on five occasions: 1891, 1897, 1901, 1906, and 1911. Thus only for a single year, 1892, can the excessive mortality be attributed to the food crisis caused by the drought of 1891.

Zaitsev demonstrated that there was no simple correlation between the crude death rate and the harvest in a given period. He even found that in the Ukraine and Volga regions, the crude death rate rose in years when the harvest was above the trend over the period from 1871 to 1913 (suggesting, perhaps, that depressed prices left families without the means to purchase other foodstuffs, or that the wages of agricultural laborers had been squeezed by employers). The positive correlation between the harvest and the crude death rate improved, however, when Zaitsev lagged this variable by one year. That is, he found that a poor harvest tended to inflate mortality in the following year. Younger age groups were especially susceptible to undernourishment, which rendered them vulnerable to disease (Gatrell, 1986).

There are only a few Russian reports on the food situation in regions of the Russian Empire in the pre-war period. Although none of them mentions a serious food crisis or famine in the Russian Empire, they give some information about the remarkable consequences of crop failures.

One report (Zak, 1925) is of particular interest as it investigates the consequences for non-productive regions of the shortage of grain delivered for the internal market in 1906, the worst year in the pre-war period. According to the report, non-productive regions always paid more for wheat than productive regions. This price difference reached 5 to 8 percent in an average year. Evidently, in a poor year the productive regions put pressure on grain prices. According to the report the five-year period from 1909 to 1913 was adequate from the point of view of agriculture in the country. Ten percent more grain was produced than in the previous period. The period from 1906 to 1909, which was poorer in terms of climate, was characterized by higher prices for food grain as well as feed grain (oats and barley).

Regardless of the higher grain prices, in a poor year no profit was obtained for producers as only a small part of the harvest went to market. The report calculated the marketable share of the harvest by deducting the domestic demand from the total grain harvested. Domestic demand was calculated assuming that the total demand per capita was 25 *puds* or 400 kilograms. The total demand of the population (81.3 million) in European Russia reached 32.54 million tons (0.4 tons per capita). The marketable part of the grain was 18.75 million tons in 1901 to 1905 and 12.6 million tons in the bad period of 1906 to 1909. Between 1901 and 1905, the total cost of the marketable part of the grain was 774 million rubles, while the surplus grain was sold for 678 million rubles. The shortfall in marketable grain reached 33 percent, or 6 million tons, that should have cost 256 million rubles from 1901 to 1905 prices, although real losses reached 96 million rubles due to the rising prices. The report concluded that poor harvests resulted in the losses being unequally distributed between producers and consumers. The producers shouldered one-third of the total losses and consumers two-thirds of the total losses. The rise in prices reached 30 percent in 1906 (from 41.3 rubles to 53.8 rubles per ton).

It is worth stressing here that, according to the report, the harvest losses in 1906 were transferred totally to the marketable part of the harvest. This phenomenon becomes clear if one takes into account the very restricted level of grain consumption within a peasant household. There

Table 3.6. Grain production per capita and number of migrants from the provinces of European Russia in 1911 and 1912

Province	Number of migrants in 1911 (thousands)	Net grain production per capita in 1910–1911 (tons per annum)
Poltavskaya (7*)	20.5	0.44
Ekaterinoslavskaya (5)	17.2	0.9
Kharkovskaya (7)	14.2	0.41
Khersonskaya (5)	11.7	0.77
Mogilevskaya (8)	10.9	0.15
Kievskaya (6)	10.4	0.34
Chernigovskaya (7)	10.3	0.17
Vyatskay (4)	8.6	0.24
Podol'skay (6)	8.2	0.44
Tavrcheskaya (5)	7	1.04

Province	Number of migrants in 1912 (thousands)	Net grain production per capita in 1911–1912 (tons per annum)
Vyatskaya (4)	22.9	0.16
Samarskaya (3)	15.7	0.07
Penzenskaya (2)	12.8	0.2
Tambovskaya (1)	12.3	0.27
Kazanskaya (2)	11.9	0.09
Ufinskaya (4)	11.8	0.06
Poltavskaya (7)	11.3	0.41
Voronezhskaya (1)	11	0.29
Saratovskaya (2)	10.8	0.13
Ekaterinoslavskaya(5)	10.3	0.68
Simbirskaya (2)	10	0.1

*1. Central Black Earth region; 2. Middle Volga; 3. Low Volga; 4. Urals; 5. Novorossyskaya; 6. Southwestern region; 7. Malorossyskaya (Ukraine); 8. Belarus

Source: *Statisticheskii ezhegodnik Rossii: 1915, 1916.*

seems to be no way that peasants could reduce their own consumption in order to compensate the losses of grain that could be sold on the open market. This is why the peasants had to reduce the amount of grain for sale on the market even if it resulted in their suffering some financial

losses as compared with a normal year. As we estimated above, the harvest of 1906 was lower by roughly 15 percent, but the regions outside the agricultural zone faced a reduction in the grain available on the market of up to 33 percent. Thus the fluctuation in terms of grain available on the market could be much higher than that of the grain harvest.

Another report reveals some of the consequences for the regions that faced grain shortages in 1911. An official statistical report (*Statisticheskii ezhegodnik Rossii: 1915, 1916*) states that a wave of peasant migration from European Russia (and the Ukraine) to Siberia and Central Asia in 1912 was associated with the poor harvest of 1911. According to the report, the difference in the list of provinces with the highest migration in 1911 and 1912 could be explained by the severe drought in the Volga basin and the Central Black Earth region in 1911. In fact, a comparison of the following data on the number of migrants with net grain production proves that the shift in the list of provinces can be explained in this way. In 1912, those from the listed provinces were migrants facing severe crop failure, while in 1911 this was not the case (Table 3.6.).

The food problems in Russia in 1916–1917 are better known to historians. They emerged not because of weather anomalies but due to the disruption of market mechanisms in Russia from 1914 to 1917. As Gatrell (1986) argues, within three short years all that had been achieved over the past two generations to develop the agricultural commodity market was undone. Political factors were responsible for food problems in the last few years of the tsarist regime.

For the Russian Empire, the war began in August 1914. Troop mobilization caused no less serious problems for the agricultural sector. In 1914, in spite of the disruption caused by this first mobilization of Russian peasants, the total sown area increased, but weather conditions were unfavorable. As a consequence, the overall grain harvest in 1914 was lower than the bumper harvest of the previous year and than the pre-war (1909 to 1913) average. In 1915, the harvest was 10 percent above the pre-war average. The sowing of grain declined slightly, but yields were 5 percent higher than the pre-war average. Moreover, because of the embargo on foreign trade, Russia had around 11 million tons of additional grain that Russian peasants retained in 1914–1915 and 1915–1916. Peasants began to consume more grain themselves, fattened their livestock, and distilled the residue into vodka (Gatrell, 1994).

Could this tendency towards increased consumption within peasant households have caused grain shortages in the country? According to

the available statistics (Popov, 1925), the amount of grain on the market reached about 17 million tons in the good year 1912–1913 (see Table 4.3 in Chapter 4). A simple calculation shows that this surplus grain would feed a rural population of 120 million entirely, even if the peasants increased their consumption by 30 percent (an extra 0.14 tons above the usual ration of 0.42 to 0.44 tons per capita). A grain deficit on the market, similar to that of 1906 (when the amount of marketable grain fell by 33 percent), could happen only as a result of a 10 to 12 percent increase in peasant consumption. Thus even a modest increase in peasant consumption would cause two quite different final results. For peasants, an increase in consumption of 10 to 12 percent (an additional 0.05 tons per capita) would not result in a great improvement in the diet of their livestock, but overall the country could suffer a lack of grain on the market. The following events illustrate the existence of this problem.

The harvest in 1916 was worse than in 1915. The area under crops had probably decreased slightly and grain yields had fallen by around 4 percent compared with the period 1909–1913. In the northern consumption regions, the harvest decreased by 9 percent of the pre-war level, while in the southern production area grain output declined by 14 percent of the pre-war figure (Gatrell, 1986). This decline would not have been crucial under normal circumstances, but in the conditions of 1916 it led to serious food problems in Russian cities during 1917.

Gatrell (1994) provides an analysis of the main reasons for the existence of food problems in central Russian cities in 1916. The main problem was the distribution of grain. In 1916 there was a good harvest in the Low Volga and western Siberia, but a bottleneck in railway transportation made supply to the central regions much more complicated, if not impossible. However, the major cause of food problems was the dismantling of the market mechanism. In its place, a system of fixed prices for government purchases was introduced. Some produce was available at unregulated prices but the fixed prices also provided little incentive for peasants to bring their grain to the cities. In November 1916 the government established a grain levy, anticipating the Bolshevik *prodrazverstka*. It coincided with an inflation in the price of manufactured goods. No subsidies were offered to food producers (as happened in Britain). The peasants naturally reacted to the grain levy by reducing the amount of food for sale to the government. They held on to their grain, hoping to sell it on the open market. Neither the tsarist regime nor the provisional government that came to power in February 1917

were able to propose a policy of food procurement that could satisfy the interests of the peasants and the needs of consumers. The imposing of a state monopoly on grain by the provisional government in March 1917 only caused the situation to deteriorate. A catastrophic decline in urban and military food supply followed. This helped destabilize the provisional government within a few months.

3.4. Summary

In the pre-war decades of the Russian Empire, the agricultural sector developed quickly. There was a remarkable increase in grain production which outpaced the unprecedented high growth in the Russian population. It is important to understand that the increase in grain production by 50 percent occurred as a result of more land being placed under cultivation. Grain exports became the major item in Russian external trade. The government was successful in developing the largest railway network in the world. The tariff system encouraged the rapid transportation of agricultural products from east to west. The internal agricultural market also developed at a high rate.

However, this success concealed the very restricted consumption of livestock products on the part of the Russian peasants. The Russian livestock sector merely stagnated, or actually fell into crisis. The Russian peasants had developed grain production only at the expense of the livestock sector (they had ploughed up meadows and planted more food cereals than feed crops). They were behaving in a quite reasonable way for a market economy, since livestock breeding had never promised to be profitable in Russian conditions due to the necessity of long stall periods and the low natural productivity of Russian meadows. The desperate condition of the livestock sector was the price of the positive balance of grain in the country, which was very important for a country located in an unstable climatic region.

Fortunately, the weather was exceptionally favorable in the pre-war decades. Only 3 of the 20 years were dry, a very good record for the Russian climate. There is no evidence that any of these droughts caused acute food crises or mass famine similar to the disaster of 1891. However, it does not mean that the country proved to be stable in terms of food production in the pre-war period. The problem was that the grain balance, although positive, was based on very restricted peasant consumption. It encouraged peasants to react to crop failure largely by cut-

ting the amount of grain for sale on the market. As a result, the amount of grain available on the market (and prices) fluctuated sharply. A grain shortage could emerge if peasants began to consume more grain within their households. In 1916–1917, quite unexpectedly, a food crisis developed in major Russian cities for one single reason: faced with the dismantling of the free market mechanism, peasants began to keep some grain to fatten their cattle and this, in combination with certain other factors, paralyzed bread supplies to the central cities. As is well known, the revolution of February 1917 began in the bread queues of Petrograd.

NOTES

- 1 The name “European Russia” is used in statistical reports of the Russian Empire for 50 provinces (from the total number of 90) including traditional Russian provinces (such as the Central or Central Black Earth) as well as Belarus and the Ukraine. Besides European Russia, statistical reports provide aggregated data for other regions: the North Caucasus (3 provinces, for example Stavropol), Poland (10 provinces), the Caucasus (9 provinces, for example Georgia), Western Siberia (4 provinces), Eastern Siberia (5 provinces), and Central Asia (9 provinces). In Soviet and post-Soviet times, the name “European Russia” was retained only for traditional Russian provinces and the North Caucasus, but not for the Ukraine or Belarus.
- 2 Official statistical reports published in the Russian Empire used their own system of the division of the country into economic regions. This system was revised several times and researchers have to make a decision as to which division they will use for the presentation of aggregated statistical data. For the pre-revolutionary period we prefer the following regional division that was used by the Russian statistical service before 1903:

Main economic regions of the Russian Empire	Provinces
Northern	Vologodskaya, Arkhangel'skaya
Northwestern	Olonetskaya (southern Karelia), Novgorodskaya, S.Peterburgskaya, Pskovskaya
Central Industrial	Vladimirskaia, Moskovskaya, Kaluzhskaya, Tverskaya, Yaroslavskaya, Kostromskaya
Central Black Earth	Kurskaya, Orlovskaya, Tulskaia, Ryazanskaya, Tambovskaya, Voronezhskaya
Middle Volga	Simbirskaya, Saratovskaya, Pensenskaya, Kazanskaya, Nizhegorodskaya
Low Volga	Samarskaya, Orenburgskaya, Astrakhanskaya
Urals	Vyatskaya, Ufimskaya, Permskaya
Northern Caucasus	Kubanskaya, Stavropol'skaya, Terskaya
Siberia	Tobol'skaya, Tomskaya, Yeniseiskaya, Irkutskaya

- 3 Methodologically, the approach adopted by Wheatcroft seems to be reasonable, with some reservations concerning the definition of “political factor”. Indeed, the author first postulates that actual production diverged from potential production because of a “political factor”. The dynamics of this factor are then determined based on the difference between actual production and weather-related potential production. If this deviation were large, some experts would explain it by the negative influence of political factors. If the deviation of observed yields from potential productivity were small, experts would say that this resulted from exclusively favorable weather conditions. This approach leaves no room for state policy to be a factor in the good performance of agriculture (see Dronin and Kirilenko, 2003).
- 4 The Summer Hydrothermal Coefficient (HTC) of Seljaninov (1966) is a compound index frequently used in Russia to distinguish territories according to both temperature and precipitation, especially for the purposes of agriculture. The HTC is defined as follows:

$$\text{HTC} = 10 * \sum_{P_i \geq 10} P_i / \sum_{T_i \geq 10} T_i, \text{ where}$$

i – number of days, and

P_i, T_i – daily precipitation and temperature

In other words, the HTC is computed as a sum of the precipitation during the vegetation period, multiplied by 10 and divided by the sum of effective temperatures (the vegetation period is defined as a period with average daily temperatures above 10 degrees C). The HTC values usually stay within 0.4 and 2, where lower values correspond to drier conditions. Values for HTC of below 0.7 are considered to characterize droughts, and values from 0.7 to 1 a moderately dry summer. In the series of maps on the geography of droughts presented in this report, a region is considered to be affected by drought if more than 50 percent of its territory is characterized by an HTC value below 0.7. All calculations of HTC for this research were made by A. Kirilenko for the climate change model for Russia elaborated by the Center for Environmental Studies of Kassel University (see preface).

The post-revolutionary period (1917–1928)

This period includes three very different historical events: the socialist revolution of 1917, the civil war between 1918 and 1921, and the New Economic Policy (NEP) of 1922 to 1928. The first two events brought the country to economic destruction, while the third was a frantic attempt by Lenin to find a way out of the desperate economic situation. Indeed, the NEP did produce considerable growth in the Soviet economy, including both industry and agriculture. It is likely that by the end of the NEP period the country was approaching the pre-war level. However, the NEP was only a temporary respite period for the Bolsheviks, and in 1928–1929 the market mechanism was forcibly demolished by Stalin.

4.1. Major developments in agriculture

One notable feature of this period was the continual and severe reduction in crop area. During the five years from 1917 to 1922, crop areas fell by 32 percent (more than 12 million hectares) in European Russia alone. In the most productive regions the decline reached 30 to 40 percent, but in several other regions the reduction was as much as 50 to 60 percent (Table 4.1.). The area sown was a major factor in the level of agricultural production. The decline in crop area resulted in the collapse of agricultural production in the country. There was also a decline in average yield in the country, which was a knock-on effect of the economic and social crisis, although a major part of the losses in potential grain production could be attributed to the decrease in the sown area.

Various factors were responsible for this unprecedented decline in area during the post-war period. A decline can be observed even before 1917. In 1914, the crop area reached its highest point since the beginning of the century. The area under cereal cultivation increased by 1.3

Table 4.1. Changes in cereal crop area from 1920 to 1924, as a percentage of the crop area in 1916

Regions	1920	1921	1922	1923	1924
European Russia	84	78	68	77	84
North	61	81	84	89	99
Northwest	62	70	78	90	94
Central	94	106	119	104	112
Black Earth	80	74	80	89	90
Volga-Vyatka	73	66	49	80	84
Middle and Low Volga	82	69	52	67	69
Urals	80	65	40	55	87
Southeast	61	57	42	62	64

Source: *Statisticheskii ezhegodnik: 1918–1920, 1921*; *Sbornik statisticheskikh svedenii po Souzy SSR: 1918–1923, 1924*.

percent between 1913 and 1914. The first stage in crop area decline was associated with the mass forced mobilization of Russian peasants into the army. The mobilization started in the autumn of 1914, taking the peasants away when they were sowing their winter crops. The impact of the resulting labor shortage manifested itself in the following year, 1915. According to most sources, the crop area in Russia decreased by between 7 and 9 percent between 1914 and 1916 (Oganovsky, 1927). This decline was more serious in the southern and southeastern regions of European Russia, as these regions traditionally hired large numbers of peasants from the overpopulated central regions of the country. Before the war about 1.5 million people arrived there to look for seasonal work.

The Central and Northwestern regions of the non-productive zone also faced labor shortages because many employable peasants moved to the two chief Russian cities, St. Petersburg and Moscow. They were looking for jobs at military enterprises that would give them the legal right to avoid mobilization. It is well known that at that time the urban population increased sharply in Russia. Because of this migration the crop area decreased by 11 percent. Before the war, the regions had imported large amounts of bread and at that time dependence on bread imports had increased. With the decline in grain production in the productive regions of the European part of the country, Siberia started to play the role of supplier of grain to the center. Siberia and Central Asia were the only regions where a growth in crop area (of over 7 percent) was observed.

Another key factor in crop area decline was that the world grain market became inaccessible to Russian peasants. Before the war Russian peasants needed only to transport their grain to a nearby railway station, where special trade offices were situated for the purchase and transportation of the grain abroad. With the start of the war, the borders were closed to such trade. This factor affected almost all of the productive regions of the south of the country. In these regions the average decline in crop area reached as much as 17 to 18 percent between 1914 and 1916. In the three years of the war, all the improvements achieved in grain production in these regions during the previous decade were wiped out (Oganovsky, 1927).

The reduction of crop area in Russia was accelerated as a result of the socialist revolution of 1917. The gross grain production for that year reached only 80 percent of the 1916 figure. The redistribution of arable land among poor peasants in the course of the so-called agrarian revolution of 1918 failed to solve the problem of rural overpopulation and the resulting land shortage. Moreover, the agrarian revolution involved the restoration of the commune and the associated archaic commune farming methods (Conquest, 2002).

The domestic agricultural market of the country collapsed. Trade exchange between city and village vanished. Between 1917 and 1921, the urban population of Russia fell by one-third as former peasants returned to their villages. Industry was destroyed. The production of food, clothes, and shoes fell 7.5-fold. The production of agricultural machines fell 31-fold, and production of mineral fertilizers stopped completely. Thus the city had nothing to give to the villages, and the villages stopped supplying the cities with agricultural products.

In the first post-revolutionary winter of 1918, when food shortages in the cities became acute, the new revolutionary authority introduced a policy of “war communism”. The core of this policy was the compulsory acquisition of grain and other foodstuffs from the peasants by the state and its agencies, using armed force where necessary. This practice lasted from 1918 to 1921 and resulted in the devastation of millions of peasant farms.

Under these economic and political constraints Russian farms were inevitably transformed from productive to subsistence farming. It was very easy for the peasants to cut themselves off from the market. By planting just enough for their own families they could be assured of an adequate food supply and could make their own clothes. They could

manage without almost anything else except salt (Goldman, 1968). Such processes resulted in a decrease in sown area. Before the war and the revolution, peasant farms were able to take 26 percent of their production to external markets (Popov, 1925). This meant that before the war a large proportion of the crop area under cereal production was allocated for the domestic and external market. As a result of the break in trade links between urban and rural Russia, cereal crop areas dropped by 20 percent (or 25 percent according to official estimates) (Oganovsky, 1927). This process covered all regions, especially those of the Northwest, Central Black Earth, and Southeast (Middle Volga) regions. In Siberia, the crop area remained unchanged during the revolution but, as a reaction to the policy of expropriation, the peasants reduced the crop area (by 17 percent) to a size sufficient to provide for their own food consumption only. According to Gatrell (1994) the result of these changes was that in the time of “war communism” the pre-revolutionary distinction between the consumption zone and production regions ceased to have any meaning.

Table 4.2. shows the significant reduction in areas growing valuable market crops. At the same time, crops not produced for the market, such as millet, buckwheat, and maize, increased in area by 18 percent. The marketable part of agricultural production was cut four-fold according to some estimations (Oganovsky, 1927).

The third stage in the reduction of crop areas was caused by a large-scale drought that affected most of the productive regions of European Russia in 1921. The crop area in the Volga basin fell by 15 to 17 percent, reaching its lowest in Bashkir region where it decreased by 21 percent (Table 4.1.). The resulting mass famine then caused a drop in the crop area farmed and affected millions of peasants. There was not enough seed grain to sow even the reduced crop area. In 1921–1922, the productive regions of European Russia lost more than 5 million hectares, or about 25 percent, of their crop area.

As for the non-productive regions, a food shortage in the cities due to the lack of grain imported from the south forced millions of Russians to move back to rural areas, and in 1921 the crop area in these regions started to increase. By 1922 it had grown considerably by 2 million hectares (Table 4.1.).

All in all, the country lost about 40 million hectares of its total crop area between 1917 and 1922. Total agricultural production decreased from 10.5 billion rubles in 1913 to between 5 and 6 billion rubles

Table 4.2. Decrease in area of valuable market crops in Russia from 1917 to 1920 (percent)

Crop	Reduction in area
Wheat (winter)	30
Wheat (spring)	23
Barley	33
Flax	58
Sugar beet	92
Tobacco	96
Cotton	89

Source: Oganovsky (1927).

(according to pre-war prices) in 1922–1923, when exports of agricultural products were only one-third of the level in the pre-war period. As for domestic turnover of agricultural products, some experts believe it was one-third of the pre-war level (Oganovsky, 1927). There was also a decrease in the labor force and other capital. According to some expert assessments the number of agricultural workers had fallen by 14.4 million (4 million women and 10.4 million men) by 1920. Taking into account the 2 to 3 million killed by famine in 1921, Russian agriculture had lost more than 30 percent of employable males.

Losses of working livestock reached more than 35 percent (according to some experts between 38 and 39 percent). Lower livestock numbers meant a reduction in manure for fertilizer and a shortage of draught animals. Farm equipment could not be used and more peasants had to sow by hand. About 40 percent of agricultural machinery was lost as well. Any amelioration works were stopped completely. Intensive farming was replaced by the badly organized ploughing of arable land. Mineral fertilizers were no longer used by the peasants.

Before the war, the monetary part of a peasant family budget varied from 30 percent in Poltavskaya province (the Ukraine) to 59 percent in Orlovskaya province (Central Black Earth region), with average levels reaching 42 percent. The situation changed radically after the revolution. An investigation of peasant families in 1921 found that nowhere did the monetary part of the family budget exceed 17.7 percent. Levels were lowest in Nemkommuna (German Commune) province (Low Volga) (at 3 percent), Leningradskaya (3.4 percent), Severo-Dvinskaya (6.6 percent), Pskovskaya (8.9 percent), Moskovskaya (9.9 percent), and Novgorodskaya (10.3 percent). Such low levels of monetary contri-

bution to peasant budgets show that peasant farms had been reduced to a subsistence type of farming.

In the first half of the period the livestock production of Soviet Russia experienced a catastrophic decline as a result of the fall in grain production at that time. In 1919 grain production was only 60 percent of pre-war levels. This resulted in at least a 10 million ton grain deficit in the country. Such a shortfall in grain production meant that only a small part of the harvest could be reserved for feeding animals, which resulted in mass slaughtering in 1919 and 1920. The drought of 1921 and the subsequent famine brought further devastation to the livestock sector in the affected regions. By 1922 only 60.1 percent of horses, 67.7 percent of cattle, 49.2 percent of sheep, and 37.5 percent of pigs had survived (compared to the levels of 1916). The total livestock losses can be estimated overall at 40 percent of the pre-war herd (Oganovsky, 1927). The fall in grain production resulted in reductions in the feed reserve to a larger extent than in other grain uses (Table 4.3.). There are reports of peasants having to eat animal feed and seed grain when faced with famine.

Faced with the hopeless decline in agriculture, the authorities were forced to replace the policy of “war communism” with the New Economic Policy (NEP), focusing on the part restoration of a market economy in the country. The NEP was proposed by V. Lenin at the Xth Communist Party Congress in March 1921, and the proposal was adopted by the party, although reluctantly. The authorities planned to replace requisitioning with a food tax, which was fixed in advance at a lower level than the previous grain quotas. The main idea was that peasants would retain any surplus, and their incentive to grow more food would thus be restored. The restoration of the market implied the restoration of the market economy. The NEP existed in the Soviet Union until 1929, when it was replaced by Stalin’s collectivization of Soviet peasants.

To what extent did the NEP restore the Russian economy? This is the key question in coming to an understanding of the NEP period, as it concerns the reasons for abolishing it in 1928. The question is still being debated. The restoration of the country’s economy began in 1923. By 1925 industrial production had already been restored to 75 percent of the pre-war level. According to Soviet statistics, net national income in 1928 had reached 119 percent of the 1913 level, but the lowest Western estimate was only 93 percent, or 26 percent less than the official Soviet data (Wheatcroft and Davies, 1994). According to official statistics, the total cereal crop area in the USSR in 1928 reached 92.2 million

Table 4.3. Cereal balance in the 1920s in the USSR (millions of tons)

Elements of balance	1912–1913	1923–1924	1924–1925
Gross grain production	73.3	52.8	46.9
Seed	11.8	9.4	9.6
Food for rural population	27.6	26.3	24.6
Feed	11.07	6.9	5.97
Summary	50.47	42.7	40.2
Food for urban population	5.16	4.29	4.27
Army	0.83	0.69	4.95
Export	10.7	2.55	-
Industry	0.35	0.15	0.15

Source: Popov (1925).

hectares as compared with 94.4 million hectares in 1913. However, it is not easy to prove that agricultural production had reached the pre-war level as a result of the NEP. The Soviet and Western estimates of grain production in 1928 as compared with 1913 differed considerably, ranging from 4 and 8 percent lower (Soviet data) to 20 percent lower (Western estimate) (*ibid.*). It is known that the Central Statistical Board of the Soviet Union applied correction coefficients to data on yields obtained in the course of field research. Some modern Russian experts argue the need to apply such large correction coefficients to the original data (Kochetkov, 2000). If the Western (low) estimate is correct, it would mean that Soviet agriculture failed to achieve pre-war harvest levels even in 1928, when weather conditions were favorable.

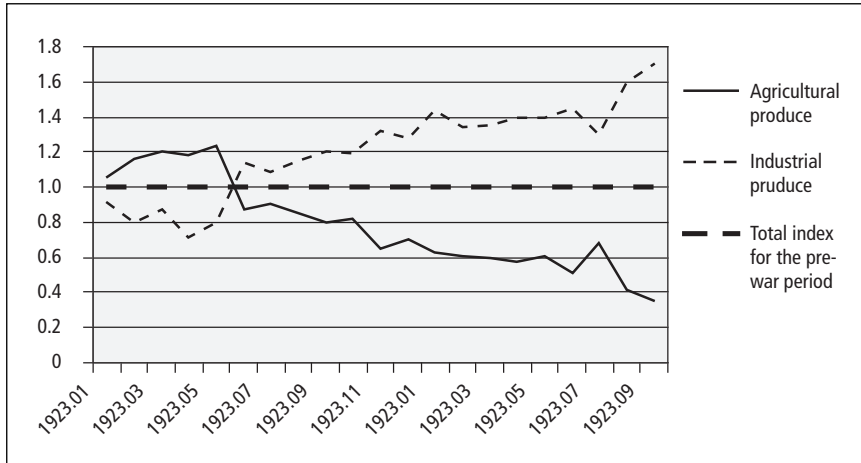
The major indicator of agricultural performance is the marketability of peasant farming. According to the prominent Soviet statistician P. I. Popov (1925), the marketability of cereal production continued to fall during the NEP period, from 16 percent in 1923–1924 to 12 percent in 1924–1925, while in the pre-war period it reached 26 percent (not taking into account the selling of bread within the peasant community). Western experts estimate that the share of agricultural output leaving villages had fallen to 16 to 17 percent in the mid-1920s. According to official Soviet estimates, even in the best year of the NEP, 1926, grain marketing had fallen to little more than half the pre-war level, reaching only 13 percent (Berelovich and Danilov, 2000a: 432). That year, grain exports amounted to only one-quarter of the 1913 level. On the whole, even between 1925 and 1927, the situation remained far

from that regarded as a “full recovering of agriculture”. In 1928, grain procurement also reached only 13 percent of the official figure for grain production (73.3 million tons). The highest estimate of grain surplus at 20,7 percent was made by Karez, (1967) but he also included in his figure a surplus grain which peasants kept for themselves or for selling inside the peasant’s community. Even so, the corresponding figure for the prewar period given by Popov (1925) was as much as 31,5 percent.

The development of the New Economic Policy was controversial from the beginning. The “food tax” was introduced immediately after the decision to launch the NEP in spring 1921. The problem was that the food tax initially resembled the expropriation approach, in so far as it was to be “paid” for agricultural products only. The size of the food tax was determined not on the basis of the actual harvest but on the calculated demand for grain. The tax was collected by special food brigades in a way that also resembled the previous use of force. Often peasants had to pay a food tax equal to their grain reserve. The food tax was one of the social factors responsible for mass famine between 1921 and 1923 in the Volga basin. Only in July 1923 did the authorities replace the food tax with a so-called unified agricultural tax. This new tax was lower than the previous one, and it became possible to pay the tax using money rather than agricultural produce. However, KGB reports confirm that in 1924 the new tax was still too high in many regions for most peasants and was collected exclusively by forcible methods including the arrest and punishment of peasants, the expropriation of peasant livestock and other possessions, etc. In the drought of 1924, mass famine occurred in some regions because of this repressive policy. Some historians regard only the period from 1925 to the summer of 1927 as the time of the “real NEP”, when Soviet peasants were not pressed by force to deliver taxes that were often beyond their means (Berelovich and Danilov, 2000b). Thus the period in which a reasonable economic policy existed lasted for only two years, and it yielded a growth in agriculture.

The problematic development of Russian agriculture during the NEP was mainly a result of the failure of the Soviet authorities’ price policy. The main stimulus for peasants to produce for the market had been to exchange their produce for manufactured goods. However, there was a chronic deficit of manufactured goods in the country. The main feature of the state price policy was that the Soviet authorities tried to maintain a ratio between the prices of manufactured goods and agricultural produce in order to provide an advantage for industry and,

Figure 4.1. Ratio of prices for agricultural and industrial products, 1922–1923



Source: Statisticheskii sbornik po Saratovskoi gubernii, 1923.

at the same time, stimulate the peasants to produce a surplus for market. The divergence between industrial and agricultural prices came to be known as “the scissors crisis”, since, plotted on a graph, it resembled the open blades of a pair of scissors (Figure 4.1.). The proposition regarding “price scissors” was first put forward at the XIIth Party Congress in April 1923. The task was to maintain a reasonable equilibrium between the prices of grain and manufactured goods, in conditions of chronic shortages of the latter. If the “scissors” opened too wide, the peasants realized that the harder they worked the less they were able to buy (Conquest, 2002). In response, they began to hold back their surplus grain. This jeopardized the flow of food to the cities and to export markets.

The first price crisis occurred in as early as the autumn of 1923 (Figure 4.1.). The peasants had just begun to respond to the improved incentives resulting from the unified agricultural tax, and their output had increased. Goldman (1968) points out that this had the effect of bringing down the price of food: “Simultaneously, after an initial drop, the prices of manufactured goods rose as factories found their needs mounting rapidly. The rise in the prices of manufactured goods was accelerated by a rapid increase in the flow of currency from the printing press, which led inevitably to inflation.”

The second crisis came in 1925. “In the summer and autumn of this year, the first substantial capital construction since the revolution

resulted in a considerable increase in demand; and serious shortages of goods resulted. The peasants, confronted by empty shelves, reduced their sales of grain. The state reacted by increasing the price of grain and reducing the resources supplied to industry, so as to restore equilibrium on the market” (Wheatcroft and Davies, 1994).

The most dramatic event in this period was the third crisis of 1927–1928, which resulted in the abolition of the NEP and the adoption by Stalin of a plan for the forced mass collectivization of the peasants. From October to December 1927, peasants sold only half as much grain to the official grain collection agencies as in the corresponding three months of 1926. This amount of grain was insufficient to meet the country’s demand. The causes of the grain crisis were complex and have been much debated by historians. Until 1987, Soviet historians attributed the failure of the grain supply to the changed post-revolutionary socio-economic structure of agriculture, combined with sabotage by the kulaks (rich peasants). In contrast, some Western political historians treat the grain shortages as merely an artificial crisis, used by Stalin as a pretext to clamp down on the peasants.

The reasons for the grain crisis of 1927 did not differ significantly from those that caused the crises in 1923 and 1925. According to Wheatcroft and Davies (1994) there was a substantial increase in industrial investment during the economic year 1926–1927. This led to the reduction of industrial retail prices in the spring of 1927. This greatly exacerbated the shortage of goods in the countryside and thus contributed to the peasants’ reluctance to sell their grain. Karez claims that the grain crisis of 1927 would have been resolved if the authorities had invested only an additional 131.5 million rubles in higher grain prices (Conquest, 2002).

However, the reaction of the Soviet authorities to the crisis of 1927 was strikingly different from the methods used to handle a similar crisis in 1925. At the end of 1927, the authorities kept the price of grain stable and pressed ahead with industrialization. The emergency measures at the beginning of 1928 involved the extensive use of compulsion to obtain grain (Wheatcroft and Davies, 1994). Although emergency measures had been put in place, the state provision of grain still decreased during 1926–1927, when the state procured 10.6 million tons of grain, and in 1927–1928 when the figure was 10.1 million tons (Vert, 1995).

One of the main official arguments for Stalin’s abolition of the NEP was that the marketability of grain production in 1926–1927 was dras-

tically lower than that in the pre-revolutionary period. According to Stalin, gross marketing by the peasants in the crop year 1926–1927 was 13.3 percent of the harvest, as compared with 26 percent in 1913. Some Western experts believe that the statistics Stalin used were incorrect. According to calculations made by Karez (1967), gross marketing in 1926–1927 should have been 16.2 million tons or 20.7 percent. Stalin's calculation was based on statistics for the grain that a peasant delivered to the state and did not take into account grain which the peasants kept for themselves to feed their livestock.

The major consequence of the relatively low price for grain was that it increased the consumption of grain by livestock within the peasant economy. In the pre-war period the peasants preferred to sell their grain reserve rather than feed it to their livestock. In the 1920s the peasants preferred to feed their livestock with grain that, in more favorable political conditions, they would have marketed. By 1926 the number of cattle nearly equaled the 1914 level, and it continued to rise in 1927 and 1928. The average weight of cattle, which partly depended on the supply of grain as fodder, was apparently higher than in 1913. The principal economic reason for this success was that meat and dairy products, unlike grain, were mainly sold on the free market, so that their prices were outside state control (Wheatcroft and Davies, 1994). Much grain was also used for producing homemade vodka. The low price of grain stimulated the illegal production of vodka, which was sold by peasants at the town market at 1,000 percent profit (Berelovich and Danilov, 2000c).

“Whatever the reason for Stalin's misuse of statistics, it did create the impression of an impending food crisis” (Goldman, 1968). It is likely that Stalin understood that the grain crises of the 1920s were caused more by a price policy that did not give peasants a stimulus to sell grain than by the low efficiency of individualized farms or even kulak sabotage. In his speech at the July Plenum in 1928 he openly recognized that “the way matters stand with the peasantry in this respect is as follows: it not only pays the state the usual taxes, direct and indirect; it also overpays in relatively high prices for manufactured goods, in the first place, and it is more or less underpaid in the prices for agricultural produce in the second place” (see Conquest, 2002: 92). Goldman (1968) correctly states that the main reason for the “emergency measures” between 1927 and 1929 was that Stalin was looking for a “final solution” to the problem of the Russian peasantry.

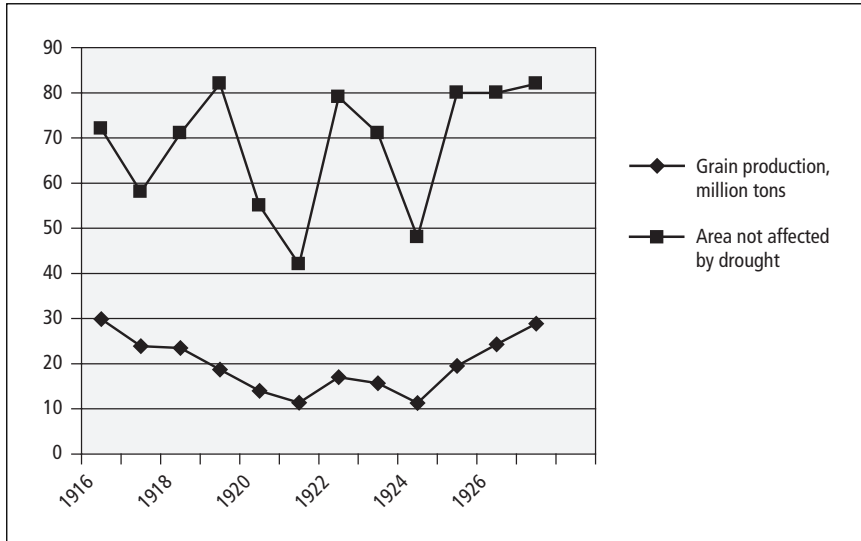
4.2. Weather variations and agricultural production

This period was politically very complex, and there are many problems concerning the availability and reliability of Soviet statistical data on agricultural production in Russia. The size of the grain harvest in 1918 and 1919 is difficult to establish with any precision because peasants concealed the extent of the sown area and harvest from the authorities. The 1920s are better covered in statistical and historical materials in relation to agricultural production and climate conditions. One of the most important sources of information about weather conditions and the state of the harvest, as well as food problems, are the unique materials of the KGB recently released and published in Russia (Berelovich and Danilov, 2000a, c). The materials represent a collection of reports that were prepared by local KGB officers for the center. Besides political events the reports contain much regional information about the state of harvests, and sometimes weather conditions. The report of the Central Administration of the Unified Hydrometeorological Service of the USSR (TsUEG), published in 1933, gives details of the droughts of 1921 and 1924 but not of 1920 (*Opyt predvaritelnogo analiza...*, 1933). We have constructed maps of the cereal yields and areas affected by the droughts for these problematic years on the basis of the drought index (HTC) devised by Seljaninov (1966).

During this period political factors played a decisive role in the dynamics of agricultural production in Russia, as illustrated by the calculations made by Wheatcroft (Wheatcroft and Davies, 1994). His “drought index” assesses how far the annual fluctuation in the degree of drought in late spring and early summer might be expected to affect the grain production. This estimate of annual fluctuations in yield due to the weather was then compared with the extent to which the actual yield in each year differed from long-term expected trends in yields (see Table 5.7. in Chapter 5).

Weather conditions were markedly less favorable between 1920 and 1924 than between 1909 and 1913, and between 1925 and 1929. It would be no exaggeration to say that the weather between 1920 and 1924 was the worst in the first decades of the twentieth century. Wheatcroft’s formula shows that, in terms of climate during this extremely unfavorable period, the weather was responsible for only 40 percent of the decline in the grain harvest while 60 percent should be attributed to political factors. Between 1925 and 1929, the weather was only slightly

Figure 4.2. Scale of drought and grain production in European Russia, 1916–1928



Source: *Statisticheskii ezhegodnik: 1918–1920, 1921*; *Selskoe khozyastvo SSSR: 1935, 1936*; Kochetkov, 2000; *Statisticheskii ezhegodnik: 1921, 1922*; *Sbornik statisticheskix svedenii po Souzy SSR: 1918–1923, 1924*.

worse than average and the influence of political factors in the reduction in grain production increased to 80 percent.

Indeed, the period between 1920 and 1924 was extremely unfavorable in terms of weather conditions, and in any other political situation such weather alone could have resulted in a serious shortfall in agricultural production. However, in the hostile political environment of the 1920s, this poor weather led to catastrophe for millions of Russian peasants. In three out of five years, large-scale droughts affected the country—in 1920, 1921, and 1924. These three years were characterized by the lowest harvests during the 1920s, as shown in Figure 4.2. Although absolute figures for grain production in Soviet Russia for some years are conflicting and certainly exaggerated, we believe that in general this graph reflects the main trends in grain production in Russia during this period. Figure 4.2 shows that total grain production does not match climate characteristics. Reduced production is explained largely by the decline in sown area and the general destruction of agriculture. The country failed to gain any advantage from the good weather which occurred in some of those years.

Table 4.4. Cereal yields in major regions of the USSR (centners per ha)

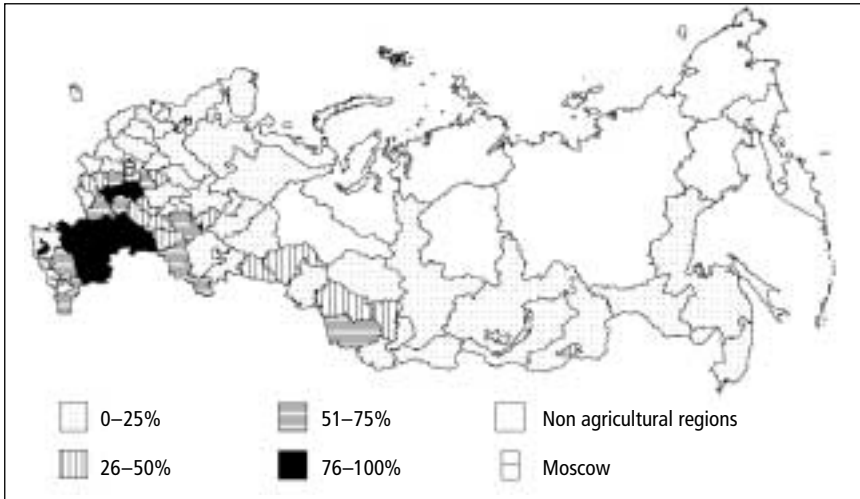
Regions	1918	1919	1920	1921	1922	1923	1924
European Russia	7.0	5.6	4.2	3.6	6.3	4.8	3.4
Central Black Earth	7.1	5.9	4.2	4.9	6.9	5.4	3.3
Volga-Vyatka	8.5	5.6	4.3	2.2	5.8	3.9	6.0
Middle Volga	9.1	5.9	2.5	1.6	4.4	3.5	2.4
Low Volga	4.1	3.6	1.3	0.6	3.3	2.4	0.3
Urals	7.2	6.6	4.6	3.4	7.1	4.8	6.3
North Caucasus	7.0	5.3	5.9	3.6	8.5	6.2	4.0
Western Siberia	8.0	7.8	4.5	5.4	6.4	4.3	3.1
Ukraine	7.2	9.2	6.8	5.4	8.3	7.5	3.6

Sources: Pre-war data *Statisticheskii ezhegodnik Rossii: 1913, 1914*; for 1918–20 *Statisticheskii ezhegodnik: 1918–1920, 1921*; for 1921 *Statisticheskii ezhegodnik: 1921, 1922*; for 1922–24 *Sbornik statisticheskikh svedenii po Souzy SSR: 1918–1923, 1924*; for 1924 (low estimate) Kochetkov, 2000.

In 1920 a large-scale drought occurred in many regions of the productive zone of European Russia. Those most affected were the Central Black Earth, the Middle Volga, and Low Volga regions (Figures 4.3. and 4.4.). As Table 4.4. shows, the low official estimates of cereal yields in these regions were 50 percent less than in pre-war times. Cereal yields in the Middle and Low Volga were extremely low, indicating that most provinces in these regions were affected by the drought. The Central Black Earth region faced a serious decline in cereal yields, but not as catastrophic in absolute figures as in the Volga basin. This indicates that the situation in this region differed in the various provinces, with western provinces being less affected than others.

There is a lack of information about synoptic conditions for the drought of 1920. One peculiarity of the drought was that it affected central provinces of European Russia. This drought belongs to the “central type”; and this geographical type is associated with a high risk of forest fires. In fact, the year 1920 was widely remembered since the drought was accompanied by numerous fires in many parts of European Russia in July. The fires were a real disaster for the country in that year. It was reported that whole districts of several Russian towns were devastated, for example in Saratov (Middle Volga). Many villages, large areas of forest, marshes, and reserves of peat stored at special sites, were destroyed by fire. Some fires lasted for weeks and consumed dozens of square kilo-

Figure 4.3. Area affected by drought in 1920



meters. There were 385 large fires registered in the country. The most affected regions were the central (forest) oblasts of Russia—Moskovskaya (99 large fires), Tverskaya (31 large fires), Novgorodskaya (30 large fires) and Kaluzhskaya (26 large fires) (Berelovich and Danilov, 2000c).

Figure 4.4. Cereal yield in 1920

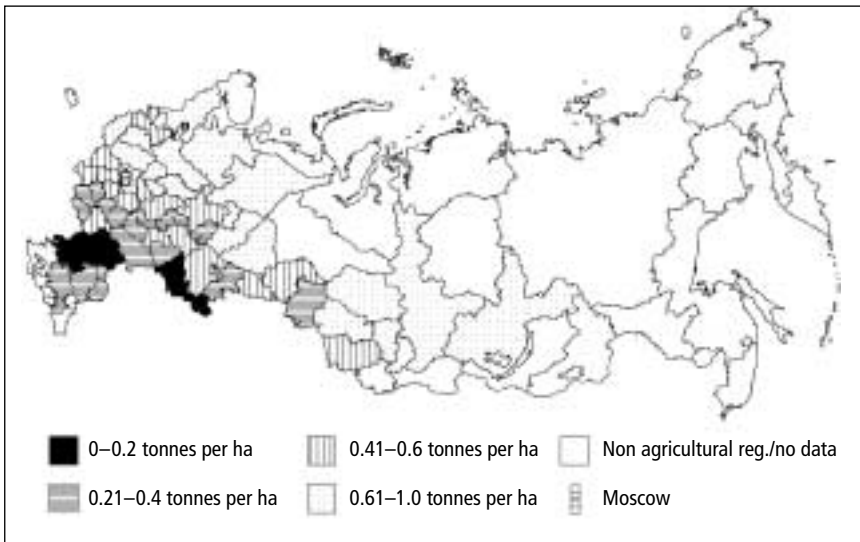
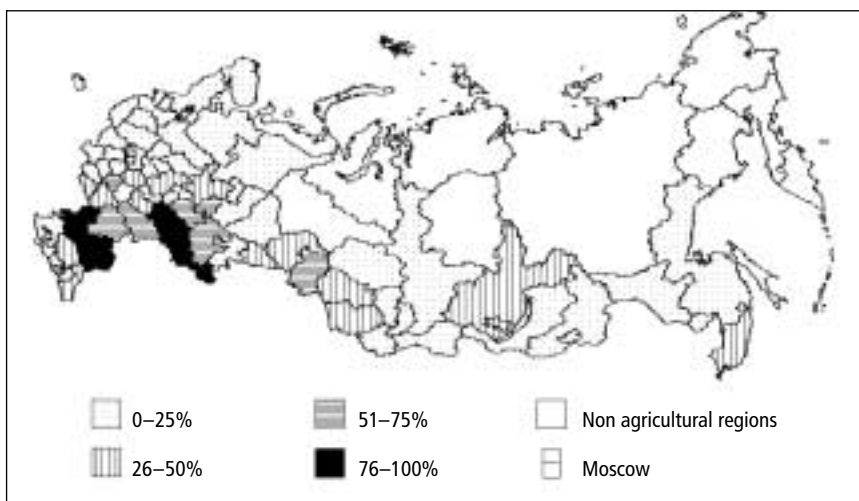


Figure 4.5. Area affected by drought in 1921

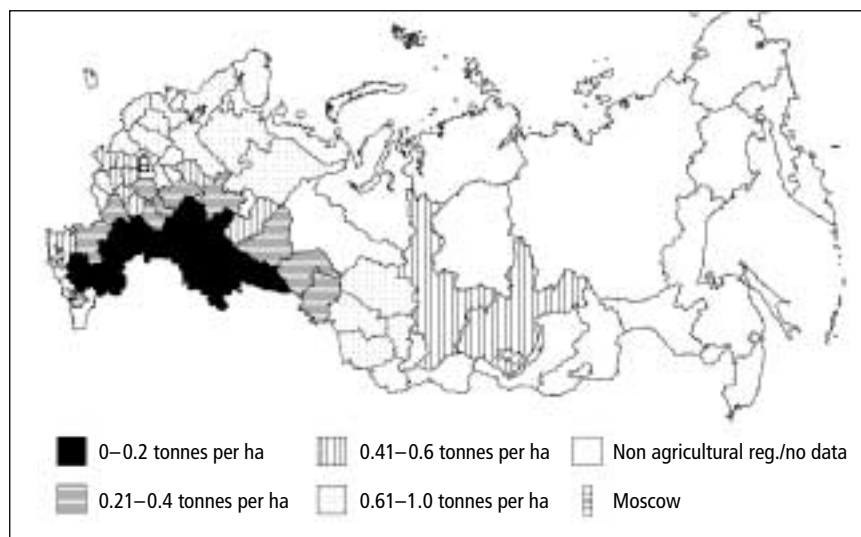


The drought in 1920 heralded the catastrophe of the following year: the 1921 drought is a well-known tragic episode in the history of twentieth-century Russia. It affected a vast territory from the northern shore of the Caspian Sea across the Low and Middle Volga, the basin of the river Ural, part of the middle section of the river Don, and many districts of southern Ukraine and the Crimea. According to Soviet sources, the drought caused extreme crop failures in these regions, affecting 30 million people (out of the 66.5 million living in European Russia). Unlike the drought of 1920 it did not affect the Central Black Earth and Central regions.

According to Conquest (2002: 55), the weather in 1921, although bad, was not at disaster level, although the report by the Soviet meteorological service (TsUEG) (*Opyt predvaritelnogo analiza...*, 1933) describes the existence of a combination of different meteorological factors that made the weather situation in 1921 an extraordinary event.

The TsUEG report provides an analysis of some of the long-term patterns of droughts in the southeastern part of European Russia. The report uses meteorological statistics for the Saratov oblast (the Middle Volga region) as a “pulse” for droughts in European Russia. Two different regular alternations of groups of dry and wet years could be observed for the Saratov region for the autumn and spring seasons. In autumn, the group of dry years came approximately once in every 10 years, while

Figure 4.6. Cereal yield in 1921



in spring the group of dry years came once every 15 years. The strongest drought occurred once every 30 years, when the coincidence of a dry autumn and dry spring was observed. Since the first recorded drought (in 1876), such situation arose only twice in 45 years, in 1891 and 1921.

The report gives details of the weather in 1920–1921. In autumn 1920, dry, cold weather dominated during October, November, and December due to a stable anticyclone centered in the basin of the river Kama and associated with an arctic air mass. The winter began much earlier than usual and was characterized by very low precipitation during the season in the Middle and Low Volga regions as well as in the southern part of European Russia. In March, a thin snow cover melted quickly, providing little or no moisture for the soil. In April and May, the anticyclone fed by a dry and warm air mass from the east produced very dry weather. Abnormally low precipitation was reported, and the drying out of the soil surface was regularly observed throughout the regions. The rivers became shallow, resulting in the interruption of boat and floating timber transportation in the basins of the rivers Volga and Kama. The situation changed in June when a cyclone affected these regions. However, the report claims that the rainy weather was too late to help the damaged crops. A comparison of figures 4.5. and 4.6., showing the area affected by droughts (according to the HTC) and cereal yields

in oblasts in 1921, indicates that the area of high crop failure was larger than the area affected by the spring drought. This can be explained in terms of the weather conditions in the autumn and winter of 1920–1921.

A catastrophic decline in cereal crops (of 50 percent from the average level) was observed in all economic regions of the Volga basin, Volga-Vyatka, and the Middle and Low Volga. Among the regions affected by the drought were the Northern Caucasus and the Urals, where cereal yields were very low, although not as dramatically so in absolute figures as in the Volga basin. In total, in the Russian Federation, the drought destroyed more than 7 million hectares of crops, or 20 percent of the total crop area, including 3.2 million hectares of the winter crop (17 percent) and 3.9 million hectares of the spring crop (12 percent). One of the most important aspects of the drought was that the major productive regions of the country, which provided the largest surplus in average years, were strongly affected by the poor weather. In the Ukraine, total losses reached 3.8 million hectares of crops, or 26 percent of the total crop area. In the southern part of the Ukraine the proportion of damaged crops was very high, at 45 percent (*Statisticheskii ezhegodnik* 1921, 1922), while the Crimea lost 46 percent of its crop. Thus three main regions of the USSR, which played the role of major grain buffers—the Ukraine, the Crimea, and the Northern Caucasus—all failed to produce a surplus of grain for the consumption regions in 1921. The single exception was Siberia, where an average harvest was recorded.

The year 1922 was more favorable in terms of climate. The weather was wet throughout the USSR. Soviet statistician P. I. Popov (1925) argues that the extremely poor harvest of 1921 destroyed the economy of some regions completely, but the excellent harvest of 1922, on the one hand, and the New Economic Policy (NEP) on the other, made it possible to begin the restoration of the crop area straight away. Only a few problems were reported in 1922. In the Middle Volga drought affected spring cereals, and the winter crop was damaged by weeds. By the end of the summer the weather had changed radically and heavy rain became the main negative factor affecting the spring crop, causing poor sowing conditions for the following year's winter cereal in the Volga basin (Berelovich and Danilov, 2000c). The statistical data presented in Table 4.4. confirm the crop failure in the Volga basin.

Little information was published in the Soviet Union about weather conditions in 1923. Popov (1925) says only that between 1923 and 1925, the state cereal balance was formed in unfavorable conditions associated

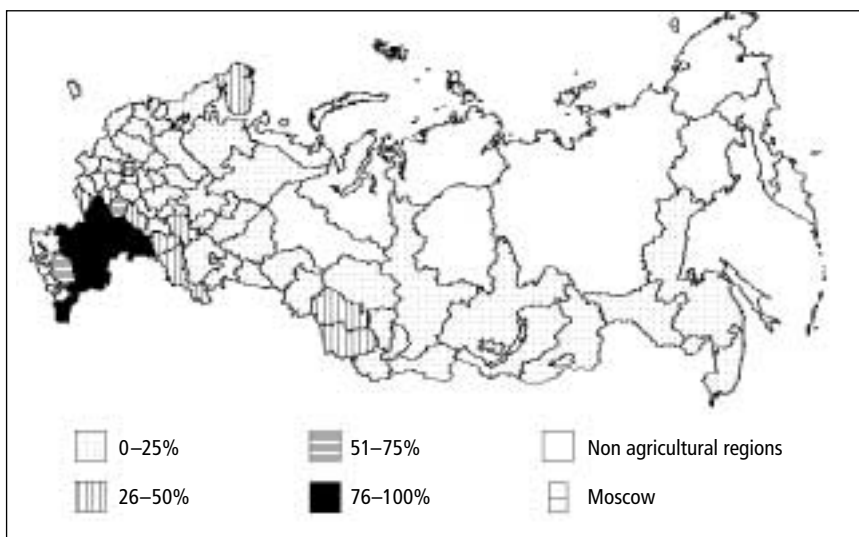
with the relatively low harvest of 1923 and extremely poor harvests in some regions in 1924. Materials from the KGB show that spring flooding was associated with the poor harvest of 1923 in many regions of Russia, as was a rainy summer in parts of European Russia although there was a drought in parts of Siberia (Berelovich and Danilov, 2000a).

If the harvest of 1923 was poor, then the crop failure that occurred in the main productive regions in 1924 was disastrous. Unfortunately, official Soviet statistics for 1924 are questionable, as can be seen from a comparison of the low and high estimates of cereal yields for some regions (see next section). However, the TsUEG report includes the drought of 1924 in its list of “catastrophic droughts” that affected Russia between 1891 and 1940 (*Opyt predvaritelnogo analiza...*, 1933). According to this report, the drought of 1924 started in May and June and lasted for more than two months. During the winter of 1924, precipitation in the Ukraine was high in contrast to the Volga basin and east to Simbirsk (Ul’yanovsk), where no precipitation was observed at all. Thus there would have been considerable differences in the humidity of the soil in the Ukraine and the Volga basin. However, according to the report, by the end of May spring crops in both regions were in the same poor state. The cause was not thought to be low precipitation but rather the abnormally high temperatures in May, which exceeded the norm by 2 to 2.5 degrees. The weather in June was also drier and warmer than May. Average temperatures for June exceeded the norm by 3 to 4 degrees and in some areas of the Ukraine (the basin of the river Donets) by as much as 5 degrees. This temperature anomaly was observed over a vast area to the south of a line between Chernigov, Orel, and Kazan. Figure 4.7. illustrates the location of the bad weather and shows that the drought was no less widespread than in 1920 and 1921.

The drought of 1924 affected the key agricultural regions of European Russia—the Ukraine, the Central Black Earth region and the Northern Caucasus. On the whole, this zone was characterized by precipitation being only 60 percent of the norm. In some places, such as Volgograd, Penza, Tambov, and Voronezh, the figure was as low as 5 to 20 percent of the norm, which resulted in damage to both winter and spring crops.

The KGB materials for 1924 confirm this shocking picture. It was reported that during the first half of the summer, in many districts of Volgograd province (Middle Volga), 100 percent of the winter and spring crop were destroyed by drought and strong, dry winds from the

Figure 4.7. Area affected by drought in 1924



southeast. In August, it was reported that about 99 percent of the rye crop had been lost in the Nemkommuna (German Commune) province of the Volga. In Saratovskaya oblast, 35 percent of the total crop area, including 22 percent of the winter crop and 58 percent of the spring crop, were destroyed by drought. In Samarskaya province, cereal yields reached only 1.6 centners per hectare, merely equaling the amount sown.

A further report stated that in the Central Black Earth region the drought continued throughout the summer and it was likely that 50 percent of the spring crop would be lost. Later it was reported that in the Voronezh province, 33 percent of the crop area had been destroyed by the drought. In some districts of the oblast 70 percent of the crop was lost. In August, a report was sent from Tambovskaya province complaining that the soil was completely dry and unfit even for ploughing. Later, rainy weather came to the region and the condition of the crop improved a little.

In August, in Stavropolskaya province (the Northern Caucasus), many districts faced crop failure and a deterioration in the quality of the grain due to the drought. The grain was in such a poor condition that it could not be used for human consumption, only for feeding livestock. One report from Terskaya province in the Northern Caucasus said that 49 percent of the crop had been destroyed (Berelovich and Danilov,

2000a). A poor harvest occurred in many regions in southern Ukraine (Odesskaya, Donetskaya, Ekaterinoslavskaya) and the Crimea. The average yield for Ekaterinoslavskaya province in the Ukraine was reported to be only 2.5 centners per hectare. In Odesskaya province, 30 districts suffered as a result of drought. In the Crimea, cereal yields were less than 3.2 centners per hectare.

There is a lack of meteorological information for the period between 1925 and 1928. Our estimate of the drought index (Figure 4.2.) shows a considerable improvement in weather conditions after 1925. This, in combination with a more reasonable policy, had a positive impact on grain harvests, as can be seen from the statistics.

4.3. Food problems

Food problems in this period are well covered by historical documents in the materials of the KGB mentioned above (Berelovich and Danilov, 2000a, c). Table 4.5. was compiled on the basis of these materials, showing a number of reports by the KGB on food crises and mass famine in the economic regions of the USSR. These data indicate the regions affected by food crises and mass famine. If a report only mentions food shortages, peasant malnutrition, or mass protests about the lack of food, the situation is regarded as a “food crisis”. If, however, it mentions mass deaths or disease due to a lack of food, the area is regarded as experiencing “mass famine”.

The secret materials of the KGB are the most reliable source of information on food problems in Russia for this period and will change the traditional view of the magnitude of those problems in the 1920s. The materials show that the scale of the food crises in Russia was much larger than many Soviet and Western historians had previously believed. For example, Robert Conquest, author of *The Harvest of Sorrow* (2002), a book devoted to the mass famine in Soviet Russia in the post-revolutionary decades, does not mention the severe problems of 1923 to 1925. According to the KGB materials, in some agricultural regions acute food crises were continuous from 1920 to 1925 (Table 4.5.). It appears that the famine built up in 1920, reached its peak in 1921, and then abated during the next three years. In 1921–1922, ten million people suffered and millions died because of famine; in 1922–1923, millions of people suffered and tens of thousands died; and in 1923–1924, tens of thousands were left starving and thousands died (Berelovich and Danilov, 2000d).

Table 4.5. Number of reports of food crises and mass famine, from 1917 to 1925*

Year (July/July)	1917 /18	1918 /19	1919 /20	1920 /21	1921 /22	1922 /23	1923 /24	1924 /25
North	3/1		1/0	2/0	2/1	6/3	2/0	
Northwest	5/1	1/1	6/2	3/1	6/0	1/0	6/4	
Central	5/1	6/0	11/3	5/0	10/1		2/0	
C. Black Earth	2/0		3/0	2/0	15/7	2/2	1/0	7/6
Volga-Vyatka		2/0	4/0	11/4	58/38	20/15	4/2	1/1
Middle Volga			2/0	10/4	33/25	5/3	2/1	2/2
Low Volga			1/0	10/4	30/23	7/6		7/6
Urals			1/0	16/4	32/26	14/10		1/1
N. Caucasus				11/1	19/12	5/5	1/0	4/3
West Siberia				1/0	14/11	8/6	2/2	1/1
East Siberia					1/1	3/1	5/5	
Ukraine				2/0	26/18	11/10		12/9
All regions	15/3	9/1	29/5	73/18	246/163	82/61	25/14	37/29

* The numerator shows the total number of reports, including those on food shortages (food crises) and those on mass famine. The denominator shows only reports on mass famine, when deaths caused by famine were observed.

Source: Berelovich and Danilov, 2000a, c.

An expert looking through the KGB materials would inevitably raise questions about the reliability of the agricultural statistics for the 1920s. Soviet statistical reports contain a great diversity of statistical data on the Russian economy. One problem is that some reports provide conflicting data. For example, according to one official source grain production in European Russia reached 22.9 million tons in 1924 (*Sbornik statisticheskix svedenii po Souzy SSR*, 1924). The same source shows that in 1923 grain production in European Russia was 24.4 million tons, but an early Soviet statistical report for 1923 gives only 19.2 million tons as the high estimate and 15.8 million tons as the low estimate. If one takes the latter figures as the more accurate, grain production in 1924 should have been considerably less than 22.9 million tons.

Many data found in Soviet reports of the 1920s are questionable. For example, some reports even present optimistic data on the food consumption of rural and urban populations in the provinces for 1918 to 1922. The problem is that these statistics on agricultural production and food consumption only show food problems from 1919 to 1921

Table 4.6. Low and high official estimates of cereal yields in European Russia and some economic regions (centners per ha)

Regions	1920	1921	1922	1923	1924
European Russia	5.0/4.2	4.4/3.6	7.5/6.3	5.8/4.8	5.2/3.4
North	7.7/6.8	7.6/6.7	7.9/6.9	6.0/5.3	8.4/-
Northwest	7.1/6.3	8.4/7.4	6.6/5.8	5.9/5.2	7.9/-
Central	6.4/5.6	6.9/6.0	7.2/6.5	6.4/5.7	7.9/-
Central Black Earth	5.1/4.2	5.9/4.9	8.3/6.9	6.6/5.4	5.0/3.3
Volga-Vyatka	5.1/4.3	2.6/2.2	6.9/5.8	4.8/3.9	6.0/-
Middle Volga	3.0/2.5	2.0/1.6	5.4/4.4	4.7/3.5	2.6/2.4
Low Volga	1.6/1.3	0.8/0.6	4.1/3.3	3.4/2.4	0.3/-
Urals	5.5/4.6	3.9/3.4	8.4/7.1	6.0/4.8	9.3/6.3
North Caucasus	7.1/5.9	4.3/3.6	10/8.5	7.6/6.2	6.5/4.0
Western Siberia	5.3/4.5	6.4/5.4	7.6/6.4	5.5/4.3	4.5/3.1
Ukraine	8.1/6.8	6.4/5.4	9.9/8.3	8.9/7.5	7.0/3.6

Sources: for 1920 *Statisticheskii ezhegodnik: 1918–1920*, 1921; for 1921 *Statisticheskii ezhegodnik: 1921, 1922*; for 1922–24 *Sbornik statisticheskix svedenii po Souzy SSR: 1918–1923*, 1924; for 1924 (low estimate) Kochetkov (2000).

(when their existence was openly recognized by Soviet authorities) but do not show the severe food crises in Russia after the disastrous famine of 1922 to 1925 (which were always concealed by the authorities) (see Table 2.2.).

The same question arises if an expert analyzes the correspondence between grain production and the materials of the KGB. From 1920, Soviet statisticians applied a “correction coefficient” to field data for yields, which was subsequently raised. In general, agricultural statistics from 1919 to 1923 are more in compliance with historical documents than statistical data 1924 to 1928. Fortunately, some Soviet statistical reports contain low and high estimates of yields and grain production in the provinces, but only for the period 1920 to 1923 (Table 4.6.). Also, some authors propose their own estimates for yields based on historical documents such as data from field research (Kochetkov, 2000). This gives an opportunity to use the original (low) estimates for analyzing the food situation in this period. For example, the KGB materials confirm that mass famine in the Ukraine occurred in 1924–1925, but official statistics show only a slight decline in cereal yields (to 7.0 centners per hectare) from the average. A low estimate of yields of half that amount—

Table 4.7. Estimates of the grain deficit for the rural population in the consumption and productive zones of the USSR between 1918 and 1924 (millions of tons)

Year	1918 /19	1919 /20	1920 /21	1921 /22	1922 /23	1923 /24	1924 /25
Deficit in consumption zone	-3.1	-3.0	-3.3	-2.5	- 2.0	- 2.9	-1.6
Deficit in production zone	+2.3	+2.0	-1.9	-6.9	-1.5	+1.7	-2.3
Procurement in production zone	1.6	2.5	4.3	2.4	No data	No data	4.0

Sources: calculated on the basis of: for 1918 to 1920, *Statisticheskii ezhegodnik: 1918–1920*, 1921; for 1921 *Statisticheskii ezhegodnik: 1921*, 1922; for 1922 to 1924 *Sbornik statisticheskix svedenii po Souzy SSR: 1918–1923*, 1924; for 1924 (low estimate) Kochetkov (2000).

3.6 centners per hectare—is found in historical materials, evidently indicating the existence of the food crisis that occurred in the Ukraine in 1924–1925 (Kochetkov, 2000). This more closely corresponds to the reported social problems and favors the use of the lower rather than the higher estimates.

An analysis of the statistics reveals that the food situation changed in the course of this period and that these changes were different in the production and consumption zones. Table 4.7. shows the calculated grain balance between the consumption and production zones based on low estimates for grain production. To estimate the grain demand there is no sense in using the pre-war norm for grain consumption (0.44 kg per capita, including 0.25 tons of food grain, 0.1 tons of seed, and 0.09 tons of feed grain), as the situation was so bad that it challenged the physical survival of the peasants. The Soviet (minimum) norm for the per capita consumption of the peasants was recognized to be 0.3 tons of grain a year (19 *puds*) (Berelovich and Danilov, 2000a: 231). The grain deficit is calculated as the deviation between grain production and demand based on Soviet norms for peasant consumption. For example, the 1919–1920 agricultural year in the consumption zone, home to 23 million Russian peasants, produced 3.9 million tons, while grain demand reached 6.9 million tons. Thus the grain deficit can be calculated at 3 million tons, as shown in the table.

The data presented in Table 4.7. lead to the conclusion that the food situation for both the consumption and production zones radically changed in 1920. Vilensky (1980) points out that there were two periods in the development of food crises in Russia in the 1920s. In 1918 to 1920, the urban population proved more vulnerable to food shortages than the rural population. Famine emerged in the urban population but not among the peasants. However, in 1921–1922, the situation changed radically: the rural population succumbed to severe food crises, and mass famine occurred in many otherwise productive regions of the country.

The presence of a food crisis in Russian cities between 1918 and 1920 can be confirmed by Soviet demographic statistics. One report (Polaykov, 2000) stresses the problem of the availability and reliability of the demographic statistics for 1917 to 1920. However, the report indicates an increase in mortality in urban areas in that period. Thus the average rate of mortality in Moscow was 232 per 10,000 inhabitants from 1910 to 1914, which increased to 298 in 1918. In the first half of 1919, severe food shortages developed in Russian cities and the mortality rate in Moscow increased considerably to 504 per 10,000 inhabitants. The summer of 1919 brought some relief, and in the second half of the year the mortality rate fell to 390 persons. However, in the winter of 1920, a further increase in mortality to 426 persons was again observed. After 1921 and 1922, although mortality remained high (255 and 289) it began to decrease. In 1923 the rate fell to 140 persons and in 1925 to 134. In St. Petersburg the mortality rate was 215 per 10,000 inhabitants in 1914, 229 in 1917, 437 in 1918, 426 in 1919, 506 in 1920, and 333 in 1921. There are also fragmentary data on mortality rates in provincial cities of Russia. For example, in towns of the Vologodskaya oblast, mortality reached 703 per 10,000 inhabitants in 1919, in 1920 it fell slightly to 547, and in 1921 to 342.

The mortality rate among the urban population between 1917 and 1920 was extremely high and resulted in an overall population decrease. The causes of death among the urban population include epidemic diseases such as camp fever, which was common in St. Petersburg. Deaths as a result of famine were not often reported. However, the report acknowledges that malnutrition was a major factor determining high mortality rates. It gives the following statistics for 1920: general average bread consumption was 300 kilograms per capita but the actual supply of bread in the rural areas of non-productive regions was only 208 kilograms per capita and only 162 kilograms per capita in urban areas. In the produc-

tive zone of European Russia, the bread supply was not much better at 203 kilograms and 168 kilograms respectively. The population of Siberia (where the crop area did not actually decrease up to 1921) found themselves in a better situation. The rural population had 250 kilograms and the urban 200 kilograms per capita (Polaykov, 2000).

There were two major causes of the food crisis in the consumption zone of Russia between 1917 and 1920. In 1918 and the first half of 1919, the central industrial regions of Russia were cut off from the major productive regions due to the civil war. During 1918, the Ukraine, the Northern Caucasus, the Urals, and Western Siberia were in the hands of the White forces. These four regions provided more than 60 percent of the grain procurement in 1916. In 1919, the Northern Caucasus and the Ukraine were again out of reach for the Bolsheviks. The situation was very unstable in European Russia that year. For example, in the autumn of 1919 the White forces captured Kursk and Orel, major cities of the Central Black Earth region, though for only a short period. The Volga region, a most important region for the new authorities in terms of food provision, was the front line in 1918 and again in the summer of 1919. In 1918–1919, more than two-fifths of the grain levy fell upon just four provinces—Samara, Saratov, Penza, and Simbirsk.

The domestic grain demand of the consumption zone of European Russia is estimated at approximately 7 million tons, while grain production reached only 3.6 million tons. In the pre-war period the grain shortfall was made up by imports into the Central and Northern regions from the production zone of European Russia, Siberia and the Ukraine (Popov, 1925). Between 1917 and 1919, grain procurement provided significantly less than what was needed for the consumption zone. The calculated grain balance presented in Table 4.7. shows that grain procurement was less than the grain surplus of the productive regions in 1917 and 1918. Thus the second cause of the food crisis in the consumption zone was that the authorities failed to procure enough grain from the peasants even in regions where good harvests were observed. There was no reasonable mechanism of grain supply to the urban areas and the consumption zone in Russia. In the winter of 1917–1918, grain entered the urban economy in a haphazard and uncoordinated fashion (Gatrell, 1994).

In 1918, the Bolsheviks decreed that peasants in key food-producing regions could acquire manufactured goods in exchange for deliveries of grain. Peasants were allowed to use state mills only if they had

already delivered their surplus grain to the state. According to some KGB reports, in the Volga basin peasants did not protest against this policy, perhaps due to the fact that they had a sufficient grain surplus. The editors of the collection of KGB reports state that during 1917 and the first half of 1918, most Russian peasants even supported the policy of the new authorities.

The relationship between the peasants and the Bolshevik authorities changed radically in the late summer of 1918 when the authorities launched the plan for the forcible mobilization of peasants and horses to the Red Army (Berelovich and Danilov, 2000d). At the beginning of 1919, the government introduced the *prodrazverstka*. The Soviet authorities themselves believed that the grain procurement campaign of 1918–1919 had brought only limited success. The authorities obtained only two-fifths of the planned procurements (Gatrell, 1994). A large proportion of the food consumed in the towns and cities still came through various informal channels, rather than through the ration system. In 1919, workers in the northern consumption regions received only 35 percent of their cereals from the ration. The remainder came from bartering or from transactions on the free market. In the producing regions the story was the same: the central grain distribution system provided no more than half of the requirements of the urban population.

However, an analysis of the statistics indicates that the procurement campaign of 1919–1920 was quite effective. The authorities procured more grain than in 1918, although the harvest of 1919 was considerably poorer than in the previous year. On the whole, the authorities managed to withdraw more grain than the surplus kept by peasants after harvesting the crop of 1919 (Table 4.7.). The regional picture is remarkable (Table 4.8.). The Central Black Earth and Volga-Vyatka regions suffered from a relatively poor harvest that year but the peasants were forced to deliver a lot of grain from their limited reserves. Other regions, such as the Urals and Western Siberia, which had enjoyed a very good harvest, delivered the same amount of grain as other, less fortunate regions. This was because, in practice, the grain levies bore no systematic relationship to the size of the harvest. The government determined the total needs of the state and apportioned quotas among all regions, irrespective of climate and other variables. Certainly there were some difficulties in procuring grain in the distant regions due to breakdowns in local administration, a shortage of capacity at state-controlled mills, transport bottlenecks, and a shortage of manufactured goods to exchange for food. In

Table 4.8. Grain surplus and grain procurement in the productive regions of the USSR, between 1918 and 1924 (millions of tons)*

Regions	1918 /19	1919 /20	1920 /21	1921 /22	1922 /23	1923 /24	1924 /25
Central Black Earth	+0.2 (0.6)	-0.6 (0.4)	-1.7 (0.4)	-1.4 (0.6)	+0.1	-0.5	-1.2 (0.3)
Volga-Vyatka	+0.6 (0.25)	-0.5 (0.5)	-1.0 (0.5)	-1.9 (0.06)	-1.1	-0.6	+0.03 (0.4)
Middle and Low Volga	+1.5 (0.7)	+0.6 (0.9)	-1.6 (0.3)	-2.2 (0.08)	-1.1	-1.1	-1.5 (0.3)
Urals	-	+0.9 (0.4)	+0.1 (0.5)	-0.5 (0.1)	-0.3	-0.3	+1.0 (0.7)
Northern Caucasus	-	-	+0.8 (0.9)	-0.4 (0.1)	+0.7	+0.7	+0.05 (0.7)
Western Siberia	-	+1.6 (0.4)	+0.4 (0.5)	+0.05 (0.3)	-0.3	-0.3	+0.3 (0.8)
Ukraine	-	-	+1.1 (1.1)	-0.5 (1.2)	+0.5	+3.8	-0.9 (0.9)
Production zone	+2.3 (1.6)	+2.0 (2.5)	-1.9 (4.3)	-6.9 (2.4)	-1.5 no data	+1.7 no data	-2.3 (4.0)

*The first figure is the surplus or deficit of grain (relative to the Soviet norm of 0.3 tons per capita per annum) before procurement. The second figure (in brackets) is the amount of state procurement in a region.

Sources: Calculated on the basis of the following reports: pre-war data, *Statisticheskii ezhegodnik Rossii: 1913, 1914*; for 1918–1920 *Statisticheskii ezhegodnik: 1918–1920, 1921*; for 1921 *Statisticheskii ezhegodnik: 1921, 1922*; for 1922–1924 *Sbornik statisticheskikh svedenii po Souzy SSR: 1918–1923, 1924*; for 1924 (low estimate), Kochetkov (2000).

general, the productive regions were more stable in terms of food supply than the consumption zone of European Russia. Even regions which suffered *prodrazverstka* (the compulsory acquisition of grain and other foodstuffs)—the Central Black Earth region (with a rural population of 14.3 million) and Volga-Vyatka (with a rural population of 8.8 million)—in spite of being left without a grain surplus, still kept enough to avoid famine and keep hope alive for the new harvest.

The following year's harvest, in 1920, was one of the worst on record, reflecting in part the seizure by the authorities of seed grain the previous year. The winter rye harvest did not exceed 50 percent of the

pre-war level, while the spring wheat harvest was even worse. At the same time, this was the peak of the requisition policy, but the government was reluctant to moderate its demands. It did cancel grain procurements in a number of regions during the winter of 1920–1921, but even so, procurements were more than two-thirds higher than the 1919–1920 levels. It is likely that this amount had already met the domestic demand of the consumption regions for the first time since the revolution (Table 4.7.), but the target was even higher—6.8 million tons. The policy resulted in mass famine in many productive regions.

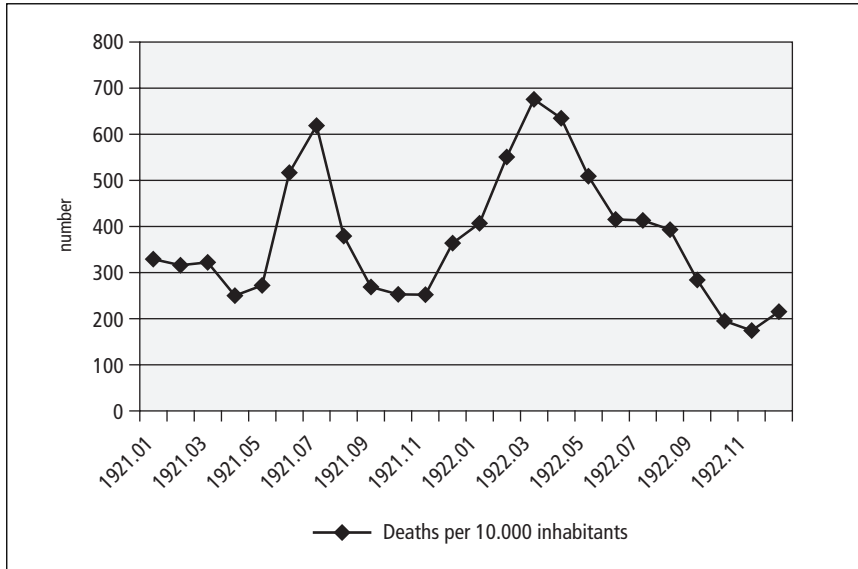
The regions most affected by the droughts were the Central Black Earth region, Volga-Vyatka, the Middle Volga, the Urals, and Western Siberia, where grain production shortfalls reached more than 35 percent from the average. Numerous KGB reports recognized that the grain levy exceeded the real grain reserve of peasants in these regions (see Table 4.8.). One report, in August 1920, confirmed that grain was being procured without taking into account the real size of the local peasant harvest in Pensenskaya oblast (Middle Volga) (Berelovich and Danilov, 2000c: 283). Another report stated that the peasants of the Samara (Low Volga) and Saratovskaya (Middle Volga) oblasts faced very poor harvests and protested fiercely because the requisition was going to leave them without the grain needed to survive until the new harvest in 1921. In the early autumn of 1920, many similar reports came from most provinces of the Volga basin and the Black Earth region. In these regions many peasants protested against the excessive requisitioning of grain and other agricultural products (ibid.: 356). In November 1920, the KGB reported an acceleration of the requisition campaign in the Volga basin, although the region had suffered an unprecedented poor harvest in 1920. It was reported that special brigades from the central provinces had come into the Nemkommuna (German commune) for a “food attack” on local peasants, who were said never to have known starvation before (unlike those in the central provinces of Russia) (ibid.: 359).

The acceleration of the *prodrazverstka* in autumn 1920 led to many peasant riots throughout the country. The best-known example of peasant resistance was by Alexander Antonov. His peasant army numbered 6,000 and fought successfully against the Red Army in the Black Earth region in the autumn of 1920 (this would explain the few reports on food problems from this region). This peasant army was defeated only by regular army troops using airplanes and even chemical weapons in June the following year.

Before the spring of 1921, the KGB reports mainly contain information about peasant complaints, protests, and riots, but none of them yet mentioned mass famine in the production regions. In April the food situation in the Volga basin started to deteriorate. Certain reports then started to use the word “famine” in descriptions of the food situation in some districts of the Volga provinces. In Bashkorstan, the political situation was said to be unsatisfactory and mass deaths in the local population were already being reported by the end of April (*ibid.*: 422). The first report that can be regarded as reliable evidence of real famine came on 23 March 1921 from Tatarstan. It reported a few cases of peasants dying through famine and suicide. However, the main reaction to the food shortages still remained peasant protests against the grain procurement campaign. Many reports tell of peasants who prevented any transportation of grain from the provinces affected by famine, and peasants also refused to sow their fields in protest. Eventually, in acknowledgment of the failure of the administrative methods, the government resolved, in March 1921, on the substitution of a tax in kind, thereby hoping to regain the trust of the peasantry.

The extreme food shortage and mass famine in 1921–1922 among peasants of the most productive regions of Russia is a well-known fact. In these regions, including the Volga-Vyatka, Middle and Low Volga, North Caucasus and, very importantly, the Ukraine, grain production was considerably below average levels. The situation was most crucial in those provinces that suffered most from food shortages during the winter and spring of 1921, and where peasants had no grain reserves because of the *prodrazverstka* (Table 4.8.). There was not even a brief period of relief from food shortages in the spring and summer of 1921 in the Volga basin. Any hopes that the local peasants had placed on the new harvest collapsed in May 1921, when the strong dry winds from the southeast brought drought. As a result, in as early as June a wave of mass famine was observed in many provinces of the region. A report from 1 June states that the peasants of Tatarstan faced a severe food crisis, and the new drought completely demoralized local peasants (*ibid.*: 448). In June, in Saratovskaya province (Middle Volga), the food situation also became dramatic and a lot of local peasants left the province for Siberia and the Ukraine (*ibid.*: 454). In Chuvashia, a report from 24 June described how the main ration for 85 percent of the population was grass (*ibid.*: 460). In Mariiskaya republic at the end of June, the population was suffering from extreme hunger (*ibid.*: 462).

Figure 4.8. Mortality rates in Saratovskaya province, 1921–1922



Source: *Statisticheskii sbornik po Saratovskoi gubernii*, 1923.

Figure 4.8. shows that July saw the first peak in mortality rates in Saratovskaya province before the rate decreased. Indeed, it was reported that from the end of July in some provinces of the Volga basin the food situation among the peasants improved because of the new harvest (*ibid.*: 470). In the provinces where the new harvest was extremely poor there was no improvement in conditions. For example, in Chuvashia, at the end of July, local peasants had already consumed their scarce grain resources harvested in 1921 (*ibid.*: 474). One more report from Chuvashia on 5 August stated that there was no more grain at all. The report also said that the first case of famine had been registered (*ibid.*: 478).

For the first time, the food problems in Russia were widely highlighted by the Soviet media. The critical food situation in the Volga basin received wide publicity in both the Soviet Union and Western countries. At the end of June, Russian newspapers were already writing about the first cases of famine in the Volga regions and calling for help for the peasants. By mid-July 1921, the focus of the Soviet media was on the mass famine in the south and southeast of European Russia. This unprecedented policy of openness concerning the food catastrophe was evidently sanctioned by the Soviet authorities. The KGB reports stated

that already in July an official propaganda campaign for food collection for the hungry had started in the Black Earth region (*ibid.*: 473). A “Week of aid for the starving people” was announced in some central provinces in the autumn (*ibid.*: 499). Large-scale international aid, mostly due to an initiative by the United States, had already started to arrive in as early as September, when two trains brought food into the Volga region.

Despite these measures mass famine emerged in Russia during the autumn and winter of 1921. In Samara (Low Volga), by the end of September 1921, the number of starving people reached 1.8 million adults and 1.1 million children (*ibid.*: 502). Poor autumn weather in some regions made the situation worse. For example, in Chuvashia (Volga-Vyatka) the first snow fell in early October killing the spring wheat crop completely. The number of starving people started to grow in January and reached its peak in March 1922 (Figure 4.8.). Some KGB reports paint a terrible picture of mass famine in the spring. It was reported that the peasants, having already eaten all the dogs, cats, and anything else edible, were even digging up corpses and using them for food. Cannibalism had become commonplace, according to the report, which called for the adoption of special measures to combat it, including the isolation of these people (the problem was that cannibalism was not a criminal offence) (*ibid.*: 562). In late March, in Chuvashia, the famine reached threatening levels. About 90 percent of the total population were starving. Many incidents of people eating corpses and dead animals were registered there (*ibid.*: 596). In Tatarstan, some villages had lost half of their population due to the famine by the end of March (*ibid.*: 598). In late spring, mortality among the peasants registered as starving reached between 30 to 50 percent (*ibid.*: 594). The situation only began to change at the end of April, when the peasants received seed from the authorities to sow for a spring crop and there were prospects of a relatively good harvest (*ibid.*: 616).

There are probably two main factors that can help in an understanding of the dramatic development of the famine in 1921–1922. In the first place, the food aid was not appropriate for the scale of the mass famine. In the best case between 30 and 35 percent of the starving in a province had access to special food distribution points set up by international organizations. However, in some provinces the proportion of hungry peasants with such access was as low as 5 percent (*ibid.*: 594).

Secondly, despite the crisis, the Soviet authorities were still conducting a repressive policy with respect to the peasantry. The *prodrazverstka* was replaced by a food tax in order to establish a food levy more in keeping with the size of the harvest, but the KGB reports, as well as a Soviet statistical report (*Statisticheskii ezhegodnik 1921, 1922*), show that even in those regions where grain production per capita was below the Soviet “hunger norm” of consumption (165 kg per capita), there was no allowance or reduction in the food levy (Table 4.9.). In the starving provinces the procurement campaign began in September and was completed only by the end of March when the new sowing campaign started. Many reports from these regions stress that the “food tax” was collected exclusively by repressive measures, including the arrest of many peasants. According to some reports the peasants saw no difference between the tax and *prodrazverstka* (ibid.: 508). There was no provision for release from the tax for regions suffering mass famine. Moreover, a new tax on the area of arable land, which had been hidden by peasants from the statistical inventory, was introduced in the regions in the winter of 1922. In only a few cases was the “food tax” suspended for a time because of the desperate food situation (Tsaritsynskaya province), but this happened only in March. Even in such cases the amount of grain that the peasants failed to deliver to the state was recorded as debt for 1922 (ibid.: 588).

There is still contradictory information about the total number of victims of the 1921–1922 famine. Most experts write that the drought affected territory with a total population of 30 million. Estimates of the number of people affected vary from 22 to 33.5 million. In 1921–1922, the number of people suffering was estimated to be 25 million. The current calculation of the total population suffering from the drought in the regions is 35 million (Polyakov, 2000). According to the KGB materials the total number of starving people by the late spring of 1922 in Ekaterinoburgskaya (Sverdlovskaya) and Chelyabinskaya provinces (the Urals) amounted to around 1.6 million; in Samarskaya (Low Volga) 3.5 million; in Saratovskaya (Middle Volga) 2 million; in Simbirskaya (Ul'yanovskaya) 1.2 million; in Stavropolskaya (Northern Caucasus) 1 million; and in the Ukraine more than 2 million. Soviet sources stated that the total number of deaths caused by famine was 1 million. This figure was certainly an underestimate. The KGB materials report about 500,000 unburied bodies in Tatarstan (Volga-Vyatka) alone. Some modest estimates of the number of deaths have been about two million

Table 4.9. Grain production and procurement (official statistics) in provinces most affected by famine in 1921–1922

Province	Population (in thousands)	Crop area (in thousands of ha)	Crop area lost, %	Yield- centner /ha	Production (in thousands of tons)	Grain procurement (in thousands of tons)	Production per capita (in kg)	Actual grain reserve per capita (in kg)
Volga-Vyatka:								
Nizhegorodsk.	1,577.60	580	15	3.7	214.6	28.1	136	118
Vyatskaya	1,946.50	1,096.30	11	3.1	339.9	26.4	175	161
Votskaya	634.7	332	36	1.9	63.1	4	99	93
Mariiskaya	290.2	215.6	59	1.8	39	0.56	134	132
Chuvashskaya	738	328.2	66	0.9	29.5	1.2	40	38
Tatarskaya	2,605	1,330	58	1.6	212.8	1.3	82	81
Middle Volga:								
Pensenskaya	1,595.20	793	3	3.2	253.8	52.3	159	126
Simbirskaya	1,449.90	727.7	35	1.2	86.2	1.8	59	58
Saratovskaya	2,628.90	1,354.90	35	1.1	149.6	15.1	57	51
Samarskaya	2,484.70	1,276.50	63	0.5	65.4	3	26	25
Nemkommuna	419	178.8	72	0.4	7.2	0.4	17	16
Tsaritsynskaya	1,019.80	835.3	34	1	83.5	3.1	8	8
Bashkirskaya	1,198	568.8	44	1.1	60.9	1.4	51	50
Low Volga:								
Astrakhanskaya	244.8	66.2	29	0.7	4.6	0.1	19	18
Urals:								
Permskaya	1,462.70	738	10	4.5	331.8	27.3	227	208
Ekaterinbugsk.	1,415	801.6	25	4	320.6	71.8	227	176
Chelyabinskaya	1,167.60	692	30	1.4	96.9	16	83	69
Tumenskaya	1,754.10	929.4	52	3.1	291.5	17.8	166	156
N. Caucasus:								
Stavropol'skaya	1,088.50	804.2	64	1.1	88.4	11.8	81	70
Donskaya	1,173	917.9	24	2.1	192.8	19.1	164	148
Ukraine:								
Ekaterinoslavsk	1,387.70	1,066.40	64	1.6	174	17.4	125	113
Nikolaevskaya	1,310.50	1,320.80	65	1.1	137.4	26	136	85
Zaporozhskaya	1,336.90	1,396.80	63	1.3	185.5	6.7	139	134

Source: *Statisticheskii ezhegodnik 1921, 1922.*

people (Berelovich and Danilov, 2000a). The highest estimate is 5 million (Kont, 1994).

By contrast, 1922 was very favorable in terms of climatic conditions. One Soviet source (Popov, 1925) called the harvest of that year excellent. Only a few incidents of poor weather (mainly in the Middle Volga) were reported. However, the food situation remained very problematic during the whole agricultural year 1922–1923. The general destruction of the peasant economy, the lack of facilities and human resources, and a dramatic reduction in the crop area resulted in rela-

tively low grain production in the regions of mass famine. In Volga-Vyatka, the Urals, and Western Siberia the total grain production in 1922 was even lower than in 1920, when climate conditions were much less favorable.

In many regions of Russia the population was completely exhausted by the mass famine of 1921–1922. Figure 4.8. shows that the mortality rate among the population of Saratovskaya oblast remained excessive throughout the whole summer of 1922. One report states that in Mariiskaya republic (Volga-Vyatka), 5,326 deaths as a result of famine were registered in June (Berelovich and Danilov, 2000c: 639). By the end of June, in Stavropolskaya province (Northern Caucasus), about 800,000 people were registered as starving and the number of deaths from famine reached 11,890 (*ibid.*: 650). A month later (24 July) some cases of cannibalism were reported in Stavropolskaya province, indicating the acuteness of the food situation there. The situation had partly improved by the autumn due to relatively good prospects for the spring crop harvest. Figure 4.8. shows that the mortality rate among the population of Saratovskaya oblast began to decline from September, reaching normal levels by November.

Until recently there was a lack of information about severe food crises and famine in Russia between 1923 and 1925. The authorities tried to cover up any facts about mass famine and food crises in the regions between these dates and manipulated the statistics to demonstrate the rapid restoration of Russian agriculture by the mid-1920s. However, the KGB materials make it possible to reconstruct the food situation in the different regions of Russia for 1923 to 1925. They show that in many other provinces the famine was not overcome during the winter and spring of 1923. The campaign for the collection of the “food tax” was again a major factor in this continuing food crisis. Some KGB reports recognized the fact that, after delivering 100 percent of their agricultural tax, peasants had no grain surplus and would inevitably face famine in the near future (Berelovich and Danilov, 2000a: 69).

A special summary review by the KGB for April and May 1923 draws a picture of a large-scale food crisis in Russia before the new crop had ripened. The highest number of starving people was observed in the Volga region, where 9 provinces suffered: in Bashkirstan there were 800,000 starving; in Saratov 900,000; in Volgograd 45,000; in Chyvasia 315,000; and in Mari 55,000. The second most severe problem occurred in the Northwestern region, where 5 provinces suffered (Arkhangelsk, Pskov, Vologda, Cherepovetz, and Karelia), then 3 provinces of the

Urals-Chelyabinsk, where 400,000, or 50 percent of the local population, were starving; Tumenskaya, with 45,000; and Permskaya, with 32,00. All in all, 32 provinces were affected by famine (*ibid.*: 125). In July 1923, many reports referred to the growing famine in the Volga basin.

The following agricultural year (1923–1924) was less favorable in terms of weather conditions than 1922, but the food situation improved, although slightly, in the country. Two groups of regions may be distinguished in terms of food problems. The first comprises provinces which suffered from poor weather conditions. The poor harvest of 1923 in central and northern regions of Russia was associated with bad spring flooding and a rainy summer and autumn. Among the productive regions only the Black Earth region was affected by unusually rainy weather. The second group of regions includes provinces which were most affected by mass famine in the previous years. The whole of the production zone of Russia had a positive grain balance, mainly due to a very good harvest in the Northern Caucasus and the Ukraine (Table 4.7.). Most provinces of the Volga basin and Western Siberia, however, had relatively poor harvests. Although dry weather was reported as the main cause of crop failure in these regions, it is evident that the depressed condition of the rural economy after three years of famine made these provinces vulnerable to even the slightest weather vagaries.

The summer of 1923 was a hard time for the Volga provinces. A report from 1 July 1923 recorded that in Mariisakaya republic more than 120,000 peasants were officially registered as starving. In Chuvashia, the famine increased: there were 281,000 starving peasants who were disillusioned when it became evident that the prospects for the harvest were very poor because of the dry weather. Saratovskaya province also faced a food crisis in mid-July. The famine was reported to be growing. About 80 percent of the local population consumed only substitute food materials. Only a few districts of the provinces had prospects of a satisfactory harvest for the winter crop. In Bashkarstan, the poor harvest of 1923 left the peasants in a state of very low morale (*ibid.*: 137). In Omskaya province (Western Siberia) there were reports about a poor harvest due to drought. Many peasants tried to leave for the central provinces of European Russia. Most of the local peasants consumed alternative substitute foods (*ibid.*: 128). Later, one more report (10 August) said that about 90 percent of the population of Omskaya oblast consumed only substitute foodstuffs.

In early autumn the situation had not changed. A KGB report reviewing the food situation throughout the country said that yields were lower than average in Tatarstan, Chuvashia, Simbirskaya, Astrakhan-skaya, Permskaya, and Ekaterinobyrskaya. The low yields were partly compensated by increases in the crop area of 20 to 25 percent in these regions. Lack of grain reserves in 1922 and poor prospects for the new harvest in some regions caused panic among the peasants. The report named six provinces of the Volga basin as the most problematic areas—Saratovskaya, Samarskaya, Simbirskaya, Tsarinskaya, Tatartstan, and Chuvashia. The report warned that the coming winter would bring famine for many regions. The report stressed that most provinces of the Volga basin lived in conditions of a long-drawn-out famine. Chuvashia was the only province where mass famine could be regarded as overcome (*ibid.*: 139).

The report also analyzed the food situation in some consumption regions which suffered because of rainy summer weather in 1923, particularly some provinces of the Central and Black Earth regions (Yaroslavskaya, Ryazanskaya, Orlovskaya), all provinces of the Northwestern region, and western provinces. In these provinces some indications of famine were already observed in early autumn. All in all the report lists 31 provinces facing food shortages.

However, the next summary report by the KGB, compiled in December, reveals that the food situation had changed. The main shortage problems were to be found only in some central and northern provinces of European Russia (Table 4.6.). According to the KGB report those provinces in which a considerable part of the population suffered from hunger were Karelia, Murmanskaya, Pskovskaya, Arkhangelskaya, Tambovskaya, and some provinces of the Far East and Eastern Siberia (*ibid.*: 166). Most importantly, despite all expectations no evidence of mass famine in the provinces of the Volga basin and Western Siberia (our second group of problematic regions) was given in the report. Later, only a few reports mentioned food problems in some provinces in the Volga basin and Western Siberia (for example, Omskaya province) in the winter and spring of 1924.

It is possible to conclude that the great famine which started in 1920 had been generally overcome in Russia by the autumn of 1923. In the winter and spring of the agricultural year 1923–1924, most reports dealt mainly with the economic problems of the peasants, associated with low prices for grain and the high “unified tax” introduced in July 1923.

A new food crisis arose in 1924, which was more a result of poor weather conditions and government repression that year than a sequel to the food crisis of the previous years. About half of the crop was destroyed in the spring and summer of 1924. 30 provinces in European Russia were affected by the drought and 11 provinces lost their crops completely (Kochetkov, 2000). By way of comparison, 34 provinces had been affected and 13 of them had lost more than 50 percent of their crop in 1921. The three regions most affected by the drought were the Central Black Earth, Middle and Low Volga, and the Ukraine. The Ukraine faced its worst harvest in the post-revolutionary period (Table 4.4.). These three regions were also most affected by mass famine. The scale of the food problems was no less than in 1920 (Table 4.5.). The procurement campaign of 1924–1925 did not differ from that of 1920 and 1921 (Table 4.8.). There was no tax relief for the regions affected by the drought.

The food crisis in 1924–1925 developed in the following way. In June 1924 the peasants, seeing no prospects for the new crop, already tried to buy grain on the market at any cost, to do which they had to sell their livestock, including draught cattle (as forage was lacking). A lot of peasants were leaving their provinces in panic. In fact, the harvesting of the winter crop at the end of July brought no relief as yields were extremely low (less than 2 centners per ha) in most provinces of Volga basin. Moreover, the quality of grain was very poor and not really suitable for food purposes. In August 1924, some indications of a severe food crisis were already reported by the KGB. In Nemkommuna (German Commune), Low Volga, about 20 percent of the peasants were eating nothing but grass and ground-squirrels only. It was reported that 50 percent of the population had no grain at all; 20 to 30 percent had grain for two to two and a half months; and only 6 to 10 percent had enough grain to survive until the harvest of 1925. In one district of the province some cases of death from famine were registered. Similar reports came from many other provinces of the Low and Middle Volga.

The situation improved a little in autumn when the spring crop was harvested. This harvest helped peasants avoid famine during the autumn and winter, but some food problems still existed. In all provinces the poorest peasants consumed food substitutes (grass, bark, needles, acorns) only. There was still panic and the expectation of a great famine comparable to 1921 (Berelovich and Danilov, 2000a: 267). The food situation deteriorated in the early spring of the following year, 1925. In

Saratovskaya, the official figure for starving peasants was as high as 300,000. In Samara, most peasants consumed only food substitutes and it was reported that this began from early December. In Pensenskaya province (Middle Volga), about 30 percent of the population consumed food substitutes (*ibid.*: 302). The eastern part of the Ukraine also faced a food crisis. In Donetskaya province the food shortage was acute and in some districts about 80 percent of peasants had no food but substitutes. In Ekaterinoslavskaya, about 50 percent of the population had no bread and 75 percent had no forage for their livestock. In Odesskaya province, 3,183 peasants were registered as starving. However, all these reports give information about a food crisis rather than mass famine.

Information about mass famine came at the end of May 1925. In the Central Black Earth region, Voronezhskaya province suffered most as many cases of diseases and deaths caused by a lack of food were reported. In Orlovskaya province, 20 percent of the population were in urgent need of food aid and several deaths were reported. In another province of the region—Tambovskaya—some deaths from famine occurred. In the Ukraine, in Poltavskaya province, several deaths were registered and the cause listed as lack of food. In the Volga basin, in Samarskaya and Pensenskaya, some deaths were reported and about 50 percent of the local peasants were registered as starving (*ibid.*: 329). This critical situation lasted until the end of July 1925, when the new crop became available. In 1925 an excellent harvest was obtained in Siberia, the Ukraine and the North Caucasus, but some regions of European Russia still had a poor harvest (Kochetkov, 2000).

The food crisis of 1924–1925 was the last in the 1920s. In the following years, up to 1927–1928, when the collectivization campaign started in the USSR, no cases of mass famine or severe crises in the regions of Russia were reported.

4.4. Summary

Historians perhaps underestimate the scale of the food crises in Russia in the 1920s. There was no agricultural policy for analysis in terms of failure or success, but rather a series of dramatic, and in some ways spontaneous, events, bringing the country to a state of continuing mass famine. In 1917, faced with the complete destruction of the market, the peasants stopped supplying the cities with their produce. In response the Bolsheviks introduced the forced requisitioning of any surplus grain

(*prodrazverstka*) in 1919. In return, the peasants began reducing their sowing areas. Catastrophic weather then occurred in the next two years. Crop failure for two years in a row was greatly aggravated by *prodrazverstka*, which sentenced millions of peasants to death as a result of famine. The New Economic Policy helped the recovery of the sown area and grain production only between 1925 and 1928. When the peasants found the state prices for grain too low, they began to retain more grain within their households. This eventually resulted in the abolition of the NEP, as Stalin was irritated by the regular failure of the grain procurement campaign. (One story goes that Stalin was once told by a peasant somewhere in Siberia that if Stalin danced for him the peasant would give the Soviet government bread.)

The deep distrust between the peasants and the Bolsheviks in the 1920s was the major reason for the mass famine. The Russian peasants apparently behaved quite reasonably from the economic point of view, reducing their production if they saw no good market. However, this policy brought them no advantages. From the beginning the Bolsheviks did not demand much from the peasants and their procurement appetite was considerably less than the amount of grain available on the market in pre-war times. Why did the Russian peasants refuse to produce surplus grain, even if it was not as profitable as previously? Why were they so willing to stop sowing and cultivating their land if they knew that there was a shortage of food in the cities and were aware of the repressive character of the Bolsheviks? Should they have recognized that any drought would be catastrophic for the country? And why did they repeat their policy of hoarding surplus grain, again threatening the cities with food shortages between 1925 and 1928? These questions are posed from the point of view of the Bolsheviks. Famine became a Bolshevik tool in their struggle against the peasants. At the beginning of the 1930s, Stalin would repeat this experience in order to crush the Russian peasantry completely.

CHAPTER 5

The collectivization of Soviet agriculture (1929–1940)

In contrast with the previous decade, this period saw a very centralized, autocratic development of the economy. During the 1930s, a Socialist economic system was being constructed, the first in the world. This new system was characterized by the priority it gave to the development of heavy industry, its extremely centralized management, the drafting of detailed five-year plans for all industrial and agricultural branches, strong administrative control over the realization of these plans, and the rapid mobilization of massive human and material resources when needed for the most important Soviet projects. Simultaneously, the actual performance of the Soviet economy became more difficult for outsiders to interpret as Soviet statistics were increasingly distorted. On the eve of World War II the country became richer due to its accelerated industrialization, but the majority of the Soviet people still lived in villages and found themselves poorer and consuming less than in the 1920s.

5.1. Major developments in agriculture

There were two major stages in the development of Soviet agriculture in the 1930s: a very short stage during which the NEP was demolished; and a longer stage which saw the accelerated construction of the Soviet system of collectivized agriculture. During two years, 1928 and 1929, the use of coercion by the state replaced the market mechanism of the NEP. The “emergency measures” of the state grain procurement plan at the beginning of 1928 became a permanent feature of the new system. From the beginning of 1930, the forcible collectivization of agriculture strengthened state control over agricultural output.

The “emergency measures” for grain collection were first put in place by the Soviet authorities in 1927–1928 in the face of the failure of the state procurement campaign. The grain procurement crisis of the

winter of 1927–1928 was not the result of kulak sabotage or a desire on the part of the peasants to combat Soviet power: the peasants simply found the grain price too low and expected it to be raised. In the winter of 1928 the official price of wheat was 1.2 rubles per *pud* (16.5 kg) and the price of rye 0.7 rubles per *pud*, while the market price of wheat reached 2.2 rubles and that of rye 1 ruble (Belorovich and Danilov, 2000b: 657). The KGB materials confirm that peasants waited for higher prices for their grain in the winter of 1928 before selling. They said that if the authorities raised the price of wheat by 1.4 rubles and that of rye by 1 ruble, they would sell their grain surplus to the state (*ibid.*: 711).

Instead, a political campaign against “speculators” began in the USSR in the February of 1928. A criminal law was adopted to force peasants to sell their grain reserves to the state and to take their grain to market. The law stated that a peasant who kept back a large portion of grain or other agricultural produce “in order to produce a price increase on the market” was to be sentenced to prison for one year and his property confiscated. The problem was that any peasant could become a victim of this law if he kept any grain reserve at all. The campaign of 1928 was accompanied by numerous cases of the expropriation of the peasants’ grain reserves. It produced some results in the following months as peasants were afraid to keep any reserves (*ibid.*: 689). However, the methods employed could not fail to remind the peasants of War Communism, and as one party activist wrote in a private letter, this similarity was kept quiet by the party (*ibid.*: 840). Meanwhile, Stalin described the emergency measures as “absolutely exceptional” (Conquest, 2002).

One of the results of this campaign was the reduction in the sown area in the spring of 1928. Prosperous peasants reduced their sowing area and stopped renting any land from poor peasants, which had previously been common practice (Belorovich and Danilov, 2000b: 732). The grain shortage started to return in urban areas in the late autumn of 1928 but in November Stalin denounced the idea that the “extraordinary measures” should be a permanent policy. The winter of 1929, in fact, found the grain problem still unsolved. Bread rationing had been introduced in the towns, and in the autumn of 1929 meat rationing followed. Some experts argue that food rationing was caused rather by the destruction of the market mechanism than by a grain shortage in the country. Indeed, some Soviet scholars argue that this centralized rationing was caused less by procurement difficulties than as a result of the theoretical aim of having non-commodity, non-market exchange (Conquest,

Table 5.1. Grain production and collection (Western low estimates) from 1927–1940 (million tons)

Year	Grain production, million tons	Grain collection, million tons	Remainder of harvest, million tons	Share of grain delivery from grain production, %
1927/28	62.05	11.05	51	17.8
1928/29	62.79	10.79	52	17.2
1929/30	62.08	16.08	46	25.9
1930/31	64.14	22.14	42	34.5
1931/32	55.84	22.84	33	40.9
1932/33	55.78	18.78	37 or less	33.7
1933/34	65.29	23.29	42	35.7
1934/35	68.25	26.25	42	38.5
1935/36	75.39	28.39	47	37.6
1936/37	(55.6)	(27.6)	(28)	49.6
1937/38	96.94	31.94	65	32.9
1938/39	74.09	29.09	45	39.3
1939/40	72.71	30.71	42	42.2

Source: Wheatcroft and Davies, (1994a).

2002). As it was, the amount of grain collected in 1928–1929 was even lower than in the previous year (Table 5.1.).

The new grain procurement campaign of 1929–1930 started in August when 100,000 urban party members were sent into the countryside “to help the grain collection”. In autumn, the repressive element of the grain procurement campaign emerged on a large scale. The main target was to prevent peasants from selling bread on the free market. Before September, the total number of “peasant speculators” (who were still waiting for prices to rise) arrested by the KGB reached 3,000. By late October this number had reached 18,000. A KGB report stated that repression was limited to that category of peasants identified as “speculators” and did not affect the majority of the rural population (Berelovich and Danilov, 2000b: 975). The KGB reported to the Soviet authorities that in some places the free market was “completely demoralized”. The action did bring some results. For example, a KGB report from Bashkiria (the Urals) found a link between the arrest of 76 peasant “speculators” and a 147.6 percent increase in the amount of grain procured there (*ibid.*: 975). Indeed, the result of the

campaign was a radical increase in the grain collected by about 6 million tons (Table 5.1.).

The critical year 1930 started with the launch of two of Stalin's major political programs—"dekulakization" and the "mass collectivization" of Soviet agriculture. A resolution of the Politburo of the Central Committee of the Communist Party concerning the "liquidation of kulaks as a social class" was adopted at the end of January 1930. The predicted outcome of this resolution indicates the "approximate" number of kulaks in the various regions earmarked for deportation or arrest. Those arrested were to be kept in concentration camps, while others were to be resettled in the northern regions and Siberia. In the Low Volga the number of deported kulaks amounted to between 8,000 and 10,000, while the number of arrested peasants was between 3,000 and 4,000. In the Ukraine the respective figures were between 30,000 and 35,000 and 15,000; in Northern Caucasus 20,000 and 6,000 to 8,000; and in the Central Black Earth region between 10,000 and 15,000 and between 3,000 and 5,000 (Viola, Danilov, and Manning, 2000: 124). Deportation was ordered to be conducted in as short a period as possible during February and March. This seems to have been fulfilled almost completely. By December 1930, the number of peasant families deported from the Low Volga region reached 8,200, from the Ukraine 31,600, from the Northern Caucasus 23,000, and from the Central Black Earth region 8,300 (*ibid.*: 755). The problem was that nobody knew what degree of peasant prosperity should be used to categorize a kulak.

For the first time, at the end of 1927, the Soviet authorities announced a plan for the mass collectivization of the Russian peasants. The first experiment for the total collectivization of some regions of the USSR began in 1929. In early 1930, the collectivization campaign accelerated. By the end of February 1930, about 73.6 percent of peasant land had been collectivized in the Central Black Earth region. This figure is remarkable because five months earlier, in October 1929, the proportion of land collectivized there reached only 7.7 percent (*ibid.*: 225). The real rate of collectivization was much higher than originally planned. By 1 December 1930, some 49.3 percent of peasant farms in the major productive regions—the North Caucasus, and the Low and Middle Volga—were reported to have been united into *kolkhozes* (Vilensky, 1980). In the summer of 1931, more than 60 percent of peasants worked in the new *kolkhozes*. In August 1931, the Soviet authorities issued a special resolution announcing the successful completion of collectivization.

Table 5.2. Changes in crop areas in the Russian Federation (millions of hectares) and economic regions in 1928 and 1934 (thousands of hectares)

Region	Total crop area		Cereal crop area		Forage crop area	
	1928	1934	1928	1934	1928	1934
European Russia	48.1	57.4	46.4	53.8	1.7	3.6
North	981.3	1,033	926.8	946.8	54.5	86.2
Northwest	1,410	1,656.3	1,129.7	1,388.7	280.4	267.6
Central	3,780	4,816.5	3,204	3,839.5	576.1	977
Volga-Vyatka	5,012	5,695	4,871	5,325	140.9	370
Central Black Earth	8,048.2	8,614.7	7,754.4	8,008.5	293.8	606.2
Middle Volga	6,667.4	8,734.5	6,626.3	8,305	41.1	429.5
Urals	4,949.7	6,106.7	4,852.7	5,928	97	178.7
Bashkiria	2,472.7	3,135.8	2,443.9	3,060	28.8	75.8
North						
Caucasus	7,346.3	9,379.4	7,328.5	8,949.4	117.8	430
West Siberia	7,247.3	8,323.2	7,240.4	8,095	66.9	228.2

Source: *Selskoe khozyastvo SSSR: 1935, 1936.*

This period of collectivization was accompanied by a considerable growth in the crop area of the country (Table 5.2.). The average increase in the cereal crop area was 16 percent, although some productive regions increased by 20 to 25 percent. Most regions came to have a larger crop area than they had had in 1916.

It is widely accepted in historical works that the main reason for the forcible collectivization was associated with the new mainstream Soviet policy to accelerate industrialization. Agriculture was to be the main source of labor and capital for industry, and collectivization was the crucial (and brutal) mechanism by which this was achieved. Soviet agriculture played a major role in supporting the process, as the exporting of grain was the most important source of the hard currency needed to purchase modern equipment for the new industrial giants.

There was another reason for collectivization. The Soviet authorities talked about an increase in the marketability of agriculture as more and more peasant families were involved in collectivization, although there was no evidence that a kolkhoz worked more efficiently than an individual farm. In reality, this thesis reflected the fact that the Soviet

authorities found it much easier to expropriate any surplus grain from collectivized peasants. According to Conquest, “collectivization did not solve the peasant’s problems, even apart from his loss of land. The collective farms were essentially a chosen mechanism for extracting grain and other products” (Conquest, 2002: 183). In the first year of collectivization the 1928 grain collection was doubled (Table 5.1.).

The reality of the situation was that collectivized peasants were in a worse situation than individual peasants. In 1930, the People’s Commissariat for Trade used a norm for an individual peasant’s grain delivery of 19 percent of his total grain production, 32 percent for kolkhozes, and 59.6 percent for sovkhozes (*ibid.*: 619). According to other documents, collective farmers in the Ukraine had to deliver twice as much as non-collectivized peasants, at 3 and 1.5 centners per hectare respectively (*ibid.*: 614). Besides the grain deliveries to the state, kolkhozes had to pay about 20 percent of the grain harvest to the Machine-Tractor Station (MTS)¹ for the use of machinery; they had to repay seed and other loans to the state; form seed reserves of 10 to 15 percent of the annual seed requirements; and establish forage funds in correspondence with the annual requirements of the collectivized livestock. Only then could the farm make any distributions to its members. Unsurprisingly, food problems were more acute among kolkhozniks than among individual peasants.

This paradox (since one might expect that collective farmers would have received some advantage for political collaboration with the Communist authorities) supports the idea that collectivization was primarily designed by the Soviet authorities as a means for the efficient expropriation of agricultural products from the peasants. In the 1920s, the authorities had had to deploy large militarized brigades to collect the food taxes from peasants. Introducing the system of collectivized farms allowed the expropriation to be achieved more cheaply.

The state grain provision plan for a region was determined according to the proportion of collectivized peasants in that region. In general, the higher the percentage of peasants involved in kolkhozes, the higher the plan target for grain provision in that region. It is for this reason that the Soviet authorities first targeted grain-producing regions for the introduction of collectivization. In 1930, the proportion of collectivized peasant farms in non-productive regions (for example Moskovskaya and Leningradskaya oblasts) remained the lowest in the country (Table 5.3.).

Table 5.3. The scale of collectivization, grain production, and grain deliveries in regions of the USSR in 1930

Regions	Collectivization, % of peasant farms in region	Grain production, thousands of tons	Grain deliveries, thousands of tons	Share of grain delivered to the state, %
North Caucasus	60	6,698.40	3,140.00	46.90
Ukraine	38	22,725.80	8,026	35.30
Low Volga	34	3,941	1,733	44
Middle Volga	30.30	4,287.50	1,863.50	43.50
Urals	25.30	4,715.70	1,326.30	28
Bashkiria	19.70	2,343.20	573.40	25
Siberia	19.30	7,120.30	2,050.40	29
Central Black Earth	15	7,372.90	1,970.70	26.7
Tatarstan	12.10	1,548.00	250.90	16.20
Moscow oblast	7.00	3,103.90	482.90	16
Leningradskaya	6	1,100	98.4	8.9

Source: Viola, Danilov, and Manning, 2000.

According to the Soviet authorities, the marketability of grain production at the beginning of the 1930s was higher than even in the pre-war period when the grain market was being intensively developed. The average share of the grain delivery in the country had rocketed from 15 percent in late 1928 to more than 34 percent in 1930 (Table 5.1.). According to the Soviet authorities, in 1930 the “marketability” of the grain production in the Northern Caucasus was as high as 46.9 percent, in the Middle Volga region 43.5 percent, and in the Low Volga 43.9 percent (Table 5.3.). It is evident that these figures have no relation to the actual efficiency of Soviet farming at that time.

There was no definite method for calculating the “marketability” of grain production. There were occasional attempts to propose certain norms for the calculation of surplus grain. For example, it was proposed that a region should deliver 2.5 centners of grain per hectare. It is most likely that the plan for the grain delivery was determined according to the grain demand of the state in a given year. For example, the plan for state grain provision for 1934 was compiled in February 1934. It contained the plan target for each province (Viola, Danilov, and Manning, 2002: 66). It is also likely that the plan for the grain delivery of a region was determined simply using a maximum possible production estimate for that region.

The construction of the collectivized farming system seemed to provide the Soviet authorities with the possibility of planning and controlling all agricultural development parameters. The first five-year plan, adopted in 1928 (officially started in October) for the period from 1928 to 1933, contained definite planning figures for agricultural production, and all these figures were linked with other planning parameters for the development of the Soviet economy and industry (Yutkropht, 2001). The five-year plan was in any case not really a “plan” at all. It rather resembled “a body of figures which were constantly being scaled upward, and this was its sole function” (Conquest, 2002: 99).

The first five-year plan proposed an ambitious target for the grain production sector. It envisaged an increase in grain production of 36 to 45 percent over the five years from 73.1 million tons in 1928 to 105.8 million tons in 1932. This plan was completely unrealistic, not only because the target figure was too high but also because it used an exaggerated estimate for the grain production of the base year, 1928.

Here we touch on the most important question in our review of this period. From the mid-1920s, the Soviet authorities stopped publishing any harvest figures based on field data and issued only estimates calculated with the help of coefficients related to field data on both sown area and yields. Although these official statistics were later (in the 1960s) revised by Soviet statisticians, Western experts proposed their own, more radical, revision of the official data (Table 5.4.). The Soviet revision concerned only data published after 1933, when a new method for estimating the grain crop using the “biological yield” was introduced in the Soviet Union. Western experts have many reasons to believe that the data from 1928 to 1933 were exaggerated. For example, for 1928 the Western estimate is for only 63 million tons of grain to be harvested rather than the 73.1 million tons mentioned in Soviet statistical reports. The importance of such differences is obvious. An unrealistically high harvest estimate gave the Soviet authorities a base for establishing an unrealistically high plan for grain procurement, which would leave the peasants starving.

The first year (1929) of the five-year period yielded only 71.7 million tons according to official estimates and 62 million tons according to Western estimates, in both cases less than in the previous year. The next year, 1930, was characterized by more favorable weather conditions. The target adopted was very high for 1930, the plan being to raise grain production to 88.9 million tons. Soviet figures for grain production were

Table 5.4. Estimates for grain production in the USSR between 1928 and 1940 (millions of tons)

Year	Soviet estimate in 1930s	Revised Soviet estimate	Western "low" estimate
1909–1913	67.6	65.2	68
1913	80.1	76.5	79
1921	42.3	36.2	–
1928	73.3	73.3	63
1929	71.7	71.7	62
1930	83.5	83.5	65 +/-3%
1931	69.5	69.5	56 +/-9%
1932	69.8	69.8	56 +/-10%
1933	89.8	68.4	65 +/-4%
1934	89.4	67.6	68
1935	90.1	75.0	75
1936	82.7	55.8	56
1937	120.3	97.4	97
1938	95	73.6	74
1939	106.5	73.2	73
1940	95.9	86.9	87

Source: Wheatcroft and Davies, 1994.

good but less than planned—about 83.5 million tons. The Western estimate is only 64 million tons. Grain delivery was less than planned but twice that of 1928. It was a very good result and the country was able to export about 5.8 million tons in 1930. Much of the grain harvested should have been reserved for the state grain stock (Conquest, 2002).

The planned target for 1931 was fixed at 97.9 million tons but already by 1 June, when drought manifested itself in many productive regions, the authorities had to lower the plan to 85.2 million tons. The drought continued and the target was revised again to 79.2 million tons. The target was then lowered once again to 78.5 million tons, and in the autumn more realistic estimates were already assessing the harvest to be as low as 70 million tons. The plan for state grain provision was reduced as well from 26.6 million tons to 22.7 million tons. In 1931 the USSR managed to export 5.2 million tons, in spite of the very poor harvest that year (Yutkropht, 2001). In the autumn of 1931, one of the Soviet party leaders, Anastas Mikoyan, even stated that the grain problem had

been solved in the USSR. One official source reported that 69.4 million tons of grain were collected, but the more realistic Western estimate was only 55.8 million tons, the lowest for many years.

In 1932, the next planned target was set at 84.8 million tons, including 29.5 million tons for the state grain provision. Within a few months the plan for grain delivery had been cut to 23.5 million tons. This was then lowered to 22.1 million tons. Finally, the plan for gross grain production was lowered to 73.3 million tons. The actual gross grain production officially announced was even lower, at 69.9 million tons, 34 percent short of the planned target for the final year of the five-year plan. The actual size of the harvest ought not to have been unexpected as many regions were still suffering from the previous year's famine which had begun in 1931. The USSR could export only 1.8 million tons and also set 1.8 million tons aside for the state reserve (Yutkropht, 2001).

In January 1933, Stalin reported that the five-year plan had been fulfilled completely in four years and three months. This was wholly untrue: the main targets, even in industry, were nothing like achieved. In agriculture it was even worse: a mere one-eighth of the mineral fertilizer and less than a third of the tractors had been produced. The failure of the grain production sector was evident as the harvest in 1932–1933 was significantly lower than in 1928–1929. Grain exports had declined during the period. In 1933 only 0.8 million tons were exported (Conquest, 2002).

The situation was worst in the livestock sector, as even Stalin's statistics for the 1930s indicate (Table 5.5.). The livestock sector underwent disastrous changes during the first five-year plan. Between 1928 and 1933 the number of cattle fell by 44 percent, of pigs by 55 percent, and of sheep and goats by as much as 65 percent. Additionally, animal productivity, as measured in terms of live weight per head, fell. Meat production dropped by 60 percent. This decline—except in the case of pigs—was far greater than the one that had occurred as a result of the six years of world war and civil war between 1914 and 1921 (Wheatcroft and Davies, 1994a).

One of the reasons for the poor state of the livestock sector was that the remarkable growth of area under cereals and industrial crops in 1929–1931 had been achieved at the expense of natural meadows and pastures. In July 1931, the Soviet authorities adopted a special resolution "On the development of socialistic livestock", which envisaged as its main target a considerable increase in meat production for 1931–1932.

Table 5.5. Official economic indicators of development in the Soviet livestock sector (millions of rubles) in the 1930s

Indicator	1929	1930	1931	1932	1933	1934	1935
Gross production of livestock sector	5,685.7	4,405.9	4,092.9	3,292.6	2,962.4	3,283.3	3,903.0
%	100	77.5	72	57.9	52.1	57.7	68.6
Gross production of meat	2,375.8	1,722.8	1,583.3	1,193.1	963.6	865.7	1,024.4
%	100	72.5	66.6	50.2	40.6	36.4	43.1

Source: *Selskoe khozyastvo SSSR: 1935, 1936*.

The main tool was to be an increase in the area under forage crops. Indeed, in 1931 the area of the forage crop increased 1.6-fold from 373,700 to 604,700 hectares. However, this could not stop the disastrous decline in livestock numbers. The increase in forage area was probably insufficient to compensate for the decline in natural fodder (Wheatcroft and Davies, 1994a).

The reduction in the amount of grain retained was also, evidently, a major factor in the disastrous performance of the livestock sector between 1929 and 1933. The goal of increasing the state grain provision at any cost led to acute shortages of grain for peasant food consumption and for feeding livestock. However, the situation is not clear because of the hopeless distortion of the official statistics. For example, modern Russian experts, referring to the revised Soviet statistics, admit that the amount of grain allocated for feeding purposes was reduced from 18.5 million tons in 1928 to 10.2 million tons in 1932–1933 (Yutkropht, 2001). The data on feed reserves, however, do not suggest that catastrophic losses might occur in peasant herds. For example, in 1912–1913 the feed grain reserve was reported to be 11.07 million tons and a catastrophic decline in livestock inventories was observed only when this feed reserve fell to between 5 and 6 million tons in the early 1920s (Popov, 1925). In reality, the mass slaughtering of cattle in Russian villages had already started in 1929, although later Soviet statistics show that at least 15 million tons of feed grain should have been available for livestock after state procurement. The Western estimate for the grain harvest suggests that there should have been a sharp fall from 12 million tons of feed grain reserve in 1928 to 6 million tons in 1929. Certainly these latter figures are more realistic, as they explain the mass slaughtering of live-

Table 5.6. Estimates of the feed grain available for peasants' livestock in the USSR, 1927–1940, according to recent Soviet and Western data on grain production (millions of tons)

Years	Grain production (millions of tons)		Grain collection (millions of tons)	Remainder of harvest (millions of tons)		Remainder for feed	
	Soviet (high) estimate	Western (low) estimate		High estimate	Low estimate	High estimate	Low estimate
1928/29	73.3	62.79	10.79	62.5	52	23.2	12.7
1929/30	71.7	62.08	16.08	55.62	46	15.8	6.2
1930/31	83.5	64.14	22.14	61.4	42	20.86	1.5
1931/32	69.5	55.84	22.84	46.7	33	5.8	-7.9
1932/33	69.8	55.78	18.78	51.02	37	10.7	-3.3
1933/34	68.4	65.29	23.29	45.01	42	4.6	1.6
1934/35	67.6	68.25	26.25	41.25	42	0.35	1.1
1935/36	75	75.39	28.39	46.6	47	5.7	6.1
1936/37	55.8	(55.6)	(27.6)	28.2	(28)	-12.7	-12.9
1937/38	97.4	96.94	31.94	65	65	24.1	24.1
1938/39	73.6	74.09	29.09	45	45	4.1	4.1
1939/40	73.2	72.71	30.71	42	42	1.1	1.1

Source: based on Wheatcroft and Davies, 1994.

stock in 1929. Our estimates of feed grain reserves are given in Table 5.6. We calculate the feed grain reserve as the remainder of grain once the minimum (food and seed) demand of the rural population—roughly 40 million tons—has been met. The latter figure is calculated on the basis of the Soviet norm of 0.3 tons per capita. The remainder can be considered as feed grain potentially available for the peasants' livestock. We can regard 1928 as the baseline year as we know that in this year Soviet peasants retained good reserves of grain.

Losses of working cattle had an adverse effect on Soviet agriculture. From this point of view the most significant impact was the decline in the number of horses, which were the main draught animals in peasant agriculture. In 1933 the number of horses was half that of 1928 (16 and 34 million heads respectively). There was a steep decline in Russian farming between 1929 and 1933. Any advantage that was gained from the large expansion of the crop area was minimized by very low yields (less than 7 centners per ha). The move to increase the sowing area under

cereals resulted in very low quality land being cultivated. One remarkable KGB report described typical problems of land cultivation at that time. First of all, the system of crop rotation was thoroughly disrupted. Wheat had been sown for five to seven years in a row on the same area and had depleted the soil productivity. The availability of animal or mechanical power to pull the ploughs and harvest the crop was the main physical constraint on grain cultivation. While in 1928 there was one horse per 6.3 hectares of ploughland, in 1932 this figure had increased to between 10.4 and 14 hectares. It was common practice to use cows for agricultural work, including ploughing. The depth of soil tilled was only 60 to 80 millimeters, which led to weed problems. Such tilling was regarded as able to achieve acceptable results only on areas of virgin land but was not suitable for arable land that had been cultivated for many years. The report said that this practice had been proposed specifically to increase the sown area. It was important in areas of limited precipitation to complete the sowing as early as possible. For that, it was necessary to start sowing immediately after the snow thaw, but lack of working cattle and labor resources left little opportunity to sow at the proper time (Viola, Danilov, and Manning: 456). It should be added that the decline in livestock in turn resulted in a considerable reduction in the quantity of manure applied to the soil, which further impoverished the soil. The use of artificial fertilizers was almost entirely confined to industrial crops (Wheatcroft and Davies, 1994a).

A resolution of the Central Committee of the CPSU “On measures to increase yield”, adopted on 29 September 1932, for the first time recognized that further expansion of the crop area was hardly possible as it would mean too high a burden on the working cattle, the deterioration of soil quality, and hence lower productivity (Viola, Danilov, and Manning, 2001: 494). The resolution therefore stated that other ways of increasing yield had to be found. However, catastrophic famine in the Ukraine, North Caucasus, and some other areas in 1932–1933 led to a further deterioration of Soviet agriculture. Conquest refers to a foreign visitor who described the visible indications of the “extraordinary deterioration in the physical condition in what had once been an extremely fertile region. Enormous weeds, of striking height and toughness, filled up many of the gardens and could be seen waving in the fields of wheat, corn and sunflower seeds.” This region was the North Caucasus. In Kuban, there were no draught animals left, so cultivation would have been almost impossible anyway (Conquest, 2002: 280).

Many experts regard the year 1934 as the turning point, after which a growth in agricultural production and a general improvement in Soviet agriculture began. The main indicator for Soviet agriculture ought to be the growth in grain production as compared with the late 1920s. However, the main problem here is again the unreliability of Soviet agricultural statistics. The official statistics became especially distorted after 1933. Official figures published at the time purported to show that grain output had risen by 1937 to a record 120 million tons, 64 percent above the 1928 level and 50 percent higher than the highest pre-revolutionary harvest of 1913. But in the 1960s, Soviet statisticians themselves revised these figures and gave, for 1937, a figure which was 20 percent lower. The actual “barn” harvest would be even less than this figure. In any case, average cereal production during the 1930s was not higher than in the pre-revolutionary period (Vert, 1995). As for the gross agricultural production, it had barely recovered to the level of the mid-1920s. According to official figures, as estimated in the 1960s, in 1940 it exceeded the 1928 level by a mere 2.5 percent (Wheatcroft and Davies, 1994).

There is no evidence that Soviet agriculture become more advanced in terms of farming practice after 1934. Some experts note that satisfactory crop rotations were not introduced even in the more stable years of the mid-1930s. In 1935, crop rotation was practiced on no more than 40 percent of the sown area. In 1936, there was a very poor harvest because of the drought and this resulted in a chaotic situation. It is unlikely that the best harvest of 1937 was achieved because of improvements in agricultural practice, in spite of hopes for technical modernization by the Soviet authorities. They had the fixed idea that the modernization of agriculture by replacing the horse with the tractor would lead to rapid progress. The authorities made great efforts to supply kolkhozes with tractors, but supplies were far from adequate. By the end of the 1930s, some 88.5 percent of collective farms had no tractors of their own, and the Machine Tractor Stations (MTS) served only 13.6 percent of collective farms (Conquest, 2002).

A reliable indication of the poor performance of Soviet agriculture is that livestock numbers had not recovered by the end of the 1930s. From 1934 onwards the livestock sector began to recover, but only in the case of pigs, and the levels of 1928 had only been reached by 1940 (although in 1937 a decline in numbers occurred due to the drought of 1936). In fact, the number of Soviet livestock would only recover fully

by 1958. Even by 1940 the average live weight was still significantly lower than before collectivization. According to Soviet official statistics, the meat and dairy consumption of an average Soviet citizen fell by between 25 and 30 percent between 1930 and 1940 (Kiselev and Shagin, 1996).

5.2. Weather variations and agricultural production

It is widely accepted that Soviet agriculture performed poorly in the 1930s because of the destruction of traditional farming and of agricultural markets in the course of forcible collectivization. In addition, the poor weather that predominated in the 1930s could also be an important factor for crop failure in any particular year. Under Soviet political conditions, weather fluctuations were particularly damaging to agricultural development because the Soviet leaders, especially from the 1920s onwards, attached very little importance to their potential impact.

Wheatcroft discusses the role of both political and meteorological factors in the poor performance of Soviet agriculture in the 1930s (Wheatcroft and Davies, 1994). Their calculation of a “drought index” for the 1930s shows that bad weather played a significant role, particularly in the critical years of the collectivization drive in the early 1930s. The index of the predicted agrometeorological deviation from normal grain yield shows below-average conditions between 1930 and 1934 and between 1935 and 1939 (measured in centners per ha) (Table 5.7.). Poor weather conditions predominated throughout the period but, as the author notes, the reduction in yield was far too large to be explained by the weather alone. In the years 1930 to 1934, the average annual deviation of the grain yield from the trend as predicted by the weather indicator was minus 0.37 centners, but the actual deviation was as much as minus 1.83 centners. This indicates the strong influence of political factors throughout the period.

Our estimates confirm this position. Figure 5.1., based on the Western (low) estimates of grain production and the Hydrothermal Coefficient of Seljaninov, shows that the lowest harvests occurred in droughts. The most interesting thing here is that the variability of the grain production was small from year to year. This is evident when comparing the 1920s and 1930s. Generally, these two decades are close in relation to the range of deviation of yield from the trend, and the “weight” of both political and weather factors. But while the variability of the grain production for the 1930s reached only 12 percent, for the

Table 5.7. The effect of the weather on the deviation of the grain yield from the trend, 1904–1940 (centners per ha)

Year	Trend of grain yield	Actual grain yield	Deviation of actual grain yield from trend	Predicted agrometeorological deviation of grain yield from trend
1904–8 av.	6.93	6.71	-0.22	-0.13
1909–13 av.	7.3	7.68	+0.38	+0.31
1920–4 av.	8.12	6.42	-1.7	-0.68
1925–9 av.	8.49	7.88	-0.61	-0.1
1929	8.64	7.42	-1.22	+0.46
1930	8.71	7.8	-0.91	+0.84
1931	8.78	6.58	-2.2	-1.75
1932	8.86	7.04	-1.82	-0.55
1933	8.93	6.86	-2.07	+0.29
1934	9.01	6.88	-2.13	-0.67
1930–4 av.	8.86	7.03	-1.83	-0.37
1935	9.08	7.53	-1.55	+1.01
1936	9.15	5.78	-3.37	-1.28
1937	9.23	9.4	+0.17	+0.7
1938	9.3	7.36	-1.94	-0.62
1939	9.38	7.40	-1.92	-0.92
1935–9 av.	9.23	7.49	-1.73	-0.22

Source: Wheatcroft and Davies, 1994.

1920s it is as high as 25 percent. It is likely that peculiarities of the climate were the main cause of this difference in production variability. In the 1930s, dry weather generally prevailed while a great contrast in weather conditions was observed from year to year in the 1920s. A Soviet report named 1931, 1934, 1936, 1938, and 1939 as dry years in the USSR (Rudenko, 1958). However, only 1931, and especially 1936, were years of dangerous drought that extended over many of the major grain-producing regions. No annually repeated droughts occurred in this decade. The weather conditions of the 1930s were certainly unfavorable but not so bad as to be a serious enough factor to cause mass famine. Moreover, the peak of the mass famine occurred in 1932 and 1933, years which, as we show below, were good in terms of climate conditions.

Figure 5.1. Grain production and scale of drought in the USSR, 1928–1940



Source: for grain production figures: Wheatcroft and Davies, 1994.

The first three years of the period, 1928, 1929, and 1930, were characterized by relatively good weather, although some problems were reported. Unusual weather conditions occurred in the Ukraine in 1928. At the end of April a strong dust storm was observed in the southern part. The storm blew away the top layer of soil, and later deposits of this dust were observed in Romania and Poland. Winter cereals were damaged and in some places completely destroyed. The total area affected by the dust storm reached millions of square kilometers. According to some calculations, the total amount of soil blown away by the storm reached 15 million tons (Zavarina, 1954). There were also reports of a dust storm in the North Caucasus, where winter crops were seriously damaged (Buchinsky, 1974). Low yields for cereal crops in 1928 are reflected in the official statistics (*Selskoe khozyastvo v SSSR: 1935, 1936*).

One of the best years of the decade was 1930, which was characterized by very favorable weather conditions and record grain production. Poor harvests were only reported from the North Caucasus, where no rain fell in July and August. The drought killed the maize crop in many districts of the region but, importantly, the wheat crop survived. Some

problems were reported in Siberia during the period of harvesting, when heavy rains occurred from 12 August to 10 September (Viola, Danilov, and Manning: 615). Wheatcroft and Davies (1994) state that in 1930, the year in which collectivization was launched, the good harvest provided the illusion among the political leaders that the new policy could bring success. This illusion (if it existed) vanished during the following year when the country was shaken by a severe drought.

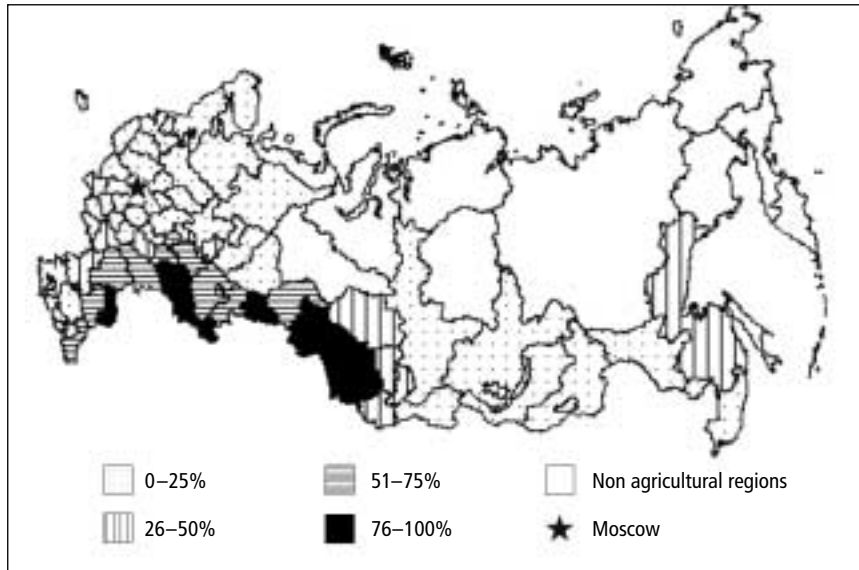
The drought of 1931 was included in the list of “catastrophic droughts” in the report by the Central Administration of the Unified Hydrometeorological Service of the USSR (TsUEG) (*Opyt predvaritelnogo analiza...*, 1933). The report regarded a region as threatened by a drought if precipitation was less than 5 millimeters in ten days. This norm was widely accepted in the 1930s and was based on the assumption (proposed by Russian scientists in the 1910s) that such an amount of moisture is inaccessible to plants as it is only sufficient to moisten the soil (Rudenko, 1958).

The TsUEG report (*Opyt predvaritelnogo analiza...*, 1933) states that the spring drought of 1931 spread from Astrakhan and Volgograd (then Stalingrad) to the left bank of the Volga river and Kama, as well as to the basins of the rivers Ufa and Ural, and occupied the whole steppe zone of Western Siberia. According to the TsUEG classification, the drought of 1931 belonged to the “eastern” geographical type. Another Soviet report stated that the drought was of a rare type that occurred when an invasion of both the polar air mass and Azor anticyclones led to the dominance of dry weather over a large part of European Russia and the southern part of Western Siberia. According to the report, similar phenomena were observed only in 1890, 1911, and 1921 (Rudenko, 1958).

Figure 5.2., based on a calculation of the HTC coefficient, shows that from May to July the main area of the drought was located to the east of the Volga river (Figure 5.2.). This area experienced more than 50 percent of dry ten-day periods (decades with precipitation of less than 5 millimeters a decade) during March to May. Between 10 and 50 percent of decades were dry in western Ukraine, Leningradskaya (Northwestern region) and Ivanovskaya (Central region) province and some provinces of the Middle Volga.

The summer of 1931 was only a little better than the spring. During the summer, 50 percent of dry decades were observed in a relatively small area—the basin of the Low Volga and Low Ural. The basin of the

Figure 5.2. Area affected by drought in 1931



river Don, some provinces of the Central Black Earth region, Tatarstan, and the south of Western Siberia all had between 30 and 50 percent of decades that were dry during the summer. The report states that the second and third decades of July were also very unfavorable there. In June, in the Middle Volga region, weather conditions were satisfactory but then 35 days of strong, hot winds were observed. It was said to be the most severe drought there since 1921. The oat crop was completely destroyed by the drought in 23 out of the 35 districts on the left bank of the Volga. As a result, only 8 of the 35 districts managed to produce any surplus grain. The remaining 23 districts failed to harvest enough grain for their own food needs. Ten districts did not even have enough grain reserves to sow their crop areas. In Bashkirskaya republic (the Urals) there was no rain during the period when the cereal was ripening. Drought and *sukhovei* came again in July and damaged the harvest in all the main districts of Bashkiria.

Although not reliable as an absolute basis, the official agricultural statistics do indicate that four regions of European Russia—the Urals, the Middle Volga, the Low Volga, and Western Siberia—were characterized by a considerable fall in grain production in 1931 (Table 5.8.). In the Urals region, production dropped by 64 percent of the previous year's

Table 5.8. Official data on grain production (millions of tons) in the key economic regions of the USSR, 1928–1934

Regions	1928	1929	1930	1931	1932	1933	1934
C. Black Earth	5.9	7.0	7.4	6.6	7.1	7.4	7.1
Volga-Vyatka	4.3	4.1	4.1	3.9	4.2	5.1	5.2
Middle Volga	5.3	3.4	4.3	3.3	4.5	5.5	7.1
Low Volga	3.8	3.3	3.9	2.9	3.2	4.2	No data
Urals	4.9	3.6	4.7	1.7	3.6	4.2	No data
N. Caucasus	5.1	5.4	6.7	7.2	5.9	8.1	No data
West Siberia	No data	5.2	5.4	3.2	4.2	6.7	8.6
Ukraine	13.9	18.7	22.7	18.3	14.7	22.3	12.3

Source: *Selskoe khozyastvo SSSR: 1935, 1936.*

level (*Selskoe khozyastvo v SSSR: 1935, 1936*). In Western Siberia, grain production decreased by 40 percent. The production shortfall in the Middle Volga reached 23 percent, and in the Low Volga ten days of drought and strong dry winds were enough to reduce yields to 3.8 centners per hectare, as compared to 6 centners per hectare in a normal year (Viola, Danilov, and Manning, 2001: 203). Total grain production fell by 17 percent of the level of 1930. The weather in 1931 was thus the overriding factor responsible for crop failure in these key regions of the USSR.

The weather conditions in 1932 are of great interest to experts studying the history of mass famine in the USSR. According to official statistics as well as Western estimates, grain production in 1932 was at roughly the same level as in 1931 (see Table 5.1.). Wheatcroft and Davies (1994) describe the situation in 1932 as a continuation of the drought of 1931, and this certainly exacerbated the grain-supply crisis which occurred during the following year's (1932–1933) famine. Was the weather so bad as to be responsible for the crop failure in 1932 and the subsequent catastrophic famine in the Ukraine and some other regions of the USSR? No Soviet report includes 1932 in its list of years with problematic climate conditions. There was a drought in some areas, but the leading Soviet experts on drought note that it was local and centered outside the Ukraine (most affected by famine in 1932–1933) (Rudenko, 1958: 164).

In the autumn of 1932, the weather conditions became the subject of heated discussion among the Soviet party leadership in connection with the contradicting estimates of grain production made by the Cen-

tral Statistical Administration and Narkomzem (the Ministry of Agriculture). The statistical service insisted that the preliminary estimate of yields made in May should be reduced, as weather conditions had deteriorated during the summer. They also referred to local authorities, pointing out that the condition of the crop had deteriorated (from mid-June) because of the dry weather. Narkozem responded by referring to original meteorological data of the Soviet network, which proved that weather conditions in most regions of the country had not deteriorated from late June, except in Moskovskaya province, Volga-Vyatka, and Low Volga (the left bank) (Viola, Danilov, and Manning, 2001: 496).

Indeed, the meteorological data (presented in their original form in Table 5.9.) show that in May most regions enjoyed sufficient precipitation, with the single exception of the left bank of the Volga river and, perhaps, some districts of Western Siberia. During June, a drought occurred in the Urals region (including Bashkiria) and many provinces of the Middle Volga (mostly located on the left bank). In July, the drought was still affecting the left bank of the Middle Volga. However, key grain-producing regions such as the North Caucasus, the Central Black Earth region and the Ukraine, were not affected by the drought. The North Caucasus suffered from extremely rainy weather. In July the total amount of precipitation in the region was about twice more than norm (about 50mm). In Ukraine during June rainy weather (June norm equals 72 mm) also prevailed. In autumn, the authorities had to revise the plan of grain procurement for North Caucasus and Ukraine but it is difficult to confirm that the revision was connected only with the weather anomaly. Materials from the KGB give the idea that the preliminary planned targets were, evidently, above the real potential for these regions devastated by a desperate shortage of human and material resources after the food crisis of 1931.

The weather in 1933 was good in most regions of the USSR. In July only the Middle Volga region reported a risk of an extreme drought which threatened to cause severe damage to the spring crop. The peasants were in a state of panic because of the oncoming drought, according to a KGB. In late July, information emerged about *sukhovei* and dry weather, which affected some districts of the left bank of the Volga. This weather was reported to have killed 5.2 percent of the winter crop. In the most affected districts of the region this figure was as high as 40 to 70 percent of the sown area. In these districts peasants were in panic (Viola, Danilov, and Manning, 2001: 781). This dry weather possibly

Table 5.9. Precipitation in spring and summer in the regions of the USSR, 1932*

Region	May Total	1st decade	June 2nd decade	3rd decade	1st decade	July 2nd decade	3rd decade
Northern	45	good	16	17	15	9	9
Moscow	40	good	15	12	15	15	10
Black Earth	40	moderate	25	26	22	21	17
Volga-Vyatka	45	good	3	17	32	15	7
Urals	60	scarce	8	8	20	25	25
Bashkiria	45	scarce	0	14	25	30	11
Tatarstan	40	moderate	0	10	16	20	20
Middle Volga (right bank)	45	scarce	0	12	15	20	5
Middle Volga (left bank)	25	drought	drought	drought	drought	drought	drought
Low Volga (left bank)	15	6	5	10	12	18	17
N. Caucasus	45	14	40	30	30	20	42
W. Siberia	scarce	scarce	20	24	13	25	18
Ukraine	55	moderate	65	36	18	18	28

* According to Soviet meteorologists, if a region experienced less than 5 mm of precipitation in a ten-day period (15 mm a month), it faced the threat of drought.

Source: Viola, Danilov, and Manning, 2001: 496).

also affected some areas of the Urals region (part of Bashkiria and Chelyabinskaya provinces) (Viola, Danilov, and Manning, 2002: 170). On the other hand, a report from the Ukraine in mid-July 1933 said that very good harvests were being obtained, especially in the steppe zone of the region (*ibid.*: 775). In the North Caucasus the harvest was excellent (*ibid.*: 781). Despite favorable weather conditions in 1933, the official statistics (after revision) confirm that the total grain production was only slightly higher than in 1932 and 1931, which again reflects the desperate condition of Soviet agriculture.

The following year, 1934, brought drought in the production zone of the country. The drought was centered on the Ukraine, where the dry weather was observed from April to July (except in the western provinces) (Buchinsky, 1974). The vegetation period was characterized by higher

than average temperatures, between two and six degrees, and very low amounts of moisture in summer (in July and August) (Rudenko, 1958). The especially poor harvest in the Ukraine is confirmed by the KGB materials. One report states that during April, May and June, precipitation in southern Ukraine was half that in the same disastrous period of 1921 (Viola, Danilov, and Manning, 2002: 209). For example, in Poltava (central Ukraine) no rain fell for 115 days, a record for this area (Buchinsky, 1974). In late August 1934, the Soviet authorities adopted a directive lowering the planned target for state grain provision for the affected regions. For the Ukraine it was reduced by 1.9 million tons.

Besides the Ukraine, the drought of 1934 affected the North Caucasus and part of the Low Volga basin to the south of Samara. A report from 14 May 1934 states that because of the spring drought the Soviet authorities ordered the sowing of additional areas in the North Caucasus and Central Black Earth region (Viola, Danilov, and Manning, 2002: 109). In the North Caucasus a large area of winter crop was killed. The region received a seed fund to carry out sowing on the damaged area (ibid.: 111).

The drought of 1934 affected mainly the western part of European Russia. In the southeastern part, dry weather was observed only on the left bank of the Low Volga. In May, in Saratov province, *sukhovei* were accompanied by very high temperatures (34 degrees) and low humidity (less than 11 percent). It was observed that dust carried by this dry storm had been kept in the atmosphere for over three days (Buchinsky, 1974). However, the remainder of the territory of the Volga basin was not affected by this poor weather. One Soviet report states that in 1934, dry weather in the southeast of European Russia was interrupted by rainy weather brought by cyclones, significantly improving the situation in the area. In autumn it was reported that an excellent harvest had been obtained in the Volga basin. According to the report, after several poor years in terms of weather conditions, that year was most favorable for meeting target plans in this region (Viola, Danilov, and Manning, 2002: 287).

Although these historical documents confirm that the total grain harvest was low in 1934, the official statistics published for this year look quite good. However, the revised agricultural statistics (published in the Soviet Union in the 1960s) show a shortfall in grain production of 19 percent when compared with the record year 1930 (surprisingly, Western estimates give higher figures for 1934). A comparison of the

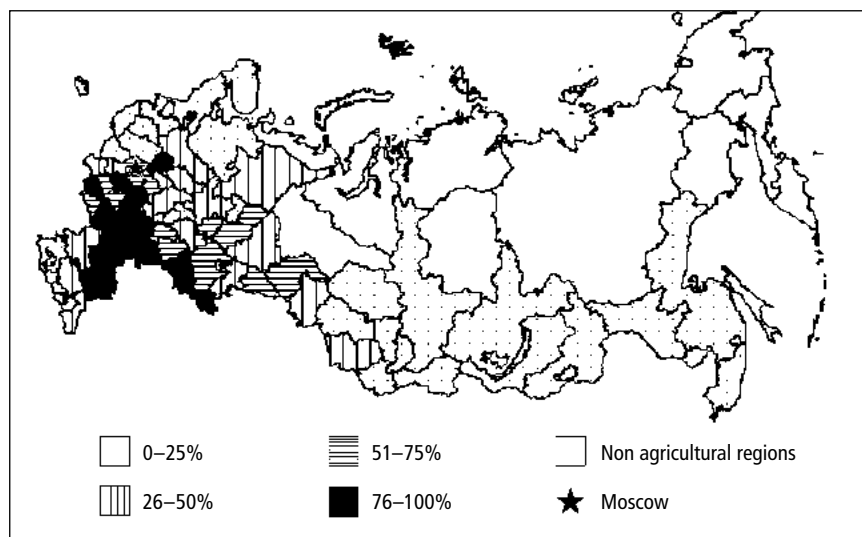
official figures for the regions shows that the Central Black Earth region faced a fall in grain production of only 4 percent as compared with 1930, but the Ukraine's harvest was 46 percent lower than in 1930. It is important to stress the impossibility of analyzing absolute figures for grain harvests because the official statistics for both 1930 and 1934 are certainly exaggerated. In 1934, the Soviet authorities stated that the average yield was 8.5 centners per hectare, but this was the so-called biological yield. Modern Russian experts believe that the average yield was 6.3 centners per hectare, and 39 percent of kolkhozes had a harvest of less than 6 centners per hectare (Moshkov, 2002).

Weather conditions in the second half of the 1930s were certainly unfavorable. It is known that in 1935 a rich harvest was obtained in the USSR, although according to Soviet (revised) data the harvest was 10 percent lower than in 1930. There are no reports of drought or other weather anomalies for that year. A record grain harvest was reported by both Soviet and Western sources for 1937, although it is difficult to judge the reliability of the figures. However, these two good years alternated with three years of drought—in 1936, 1938, and 1939.

The drought of 1936 was one of the largest in Soviet history. The drought extended over a vast territory of the USSR, including southern and central Ukraine, the Central Black Earth region, the Low and Middle Volga, some districts of middle and low Kama and Vyatka, and the Urals (Rudenko, 1958) (Figure 5.3.). In some regions (as in the Volga basin) the drought started in spring and continued throughout the whole summer. One indicator of crop failure is the revision of the planned targets for grain procurement. A report from 9 October 1936 states that local party officials in Bashkiria, Sverdlovskaya (Urals), Saratovskaya (Low Volga), Vyatsky, and Nizhegorodskaya (Volga-Vyatka) appealed to Moscow for their procurement targets to be lowered (Viola, Danilov, and Manning, 2002: 843). The total grain production of the country was the lowest for decades. According to official data it fell to 66 percent of the 1930 level and was even 20 percent less than in 1931 (Table 5.1.). The planned amount for procured grain was the lowest in the 1930s—about 12 million tons. There was a significant fall in the number of livestock that year.

One of the characteristics of this drought was that it affected not only southern regions but also the central part of European Russia, as shown by Figure 5.3. The KGB materials confirm that the drought brought many problems to these regions. A report dated 1 November

Figure 5.3. Area affected by drought in 1936



on the situation in the livestock sector notes that the state program for a steady increase in livestock had been jeopardized by the shortage of forage caused by unfavorable weather in many central provinces, and the report named Moskovskaya, Yaroslavskaya, Ivanovskaya, Gorkovskaya (Nizhegorodskaya), and Kirovskaya (Vyatskaya) (*ibid.*: 865).

One further characteristic of the drought of 1936 was that it was accompanied by dust storms in some regions. The region that suffered most because of the dry winds was the North Caucasus. A significant part of the crop in Stavropol'skaya province and some surrounding districts was destroyed, while in the rest of the area the harvest was very low (including areas that had been re-sown in the late spring). About 50 percent of the winter wheat crop was totally destroyed. There was even greater damage to sunflower and maize crops. Millet was also reported to be affected by the continuing dry winds. The vegetable crop was also very small. One Soviet expert later gave a figure of 300,000 hectares of crops damaged by the dust storms (about 10 percent of the total cereal crop area if one uses the modern administrative division of the region). The figure includes 186,000 hectares of crops that were destroyed completely (Buchinsky, 1974). The drought badly affected the livestock sector of the region, since from the early spring until late autumn there was no possibility for grazing because the grass had been

scorched by the drought. Hayfields were also destroyed and the peasants had to move their herds into the Kalmyk steppe (Viola, Danilov, and Manning, 2002: 886).

Strong, dry winds were also observed in the Central Black Earth region. A report from Voronezhskaya province states that dry winds at the beginning of the sowing season, and then insufficient precipitation, left winter and spring crops damaged in some districts of the province (*ibid.*: 850). Another report states that in June, when the prospects for a poor harvest became clear, many peasants started to leave the kolkhozes for urban areas and new industrial construction sites (*ibid.*: 868). The drought of 1936 belongs to the “central” geographical type and affected only European Russia. Western Siberia, for example, was characterized by a relatively good harvest, although some provinces of Siberia experienced rather rainy weather and deteriorating conditions for harvesting during September (*ibid.*: 842).

Unfortunately, it is very difficult to discuss in detail the droughts of 1938 and 1939. Agricultural statistics for many regions are missing for this period, thus only the main features of the climatic conditions and their impact on agricultural production are discussed below.

The center of the 1938 drought was located in an area between the Low Volga and the Urals. It affected eastern parts of the Ukraine, the Central Black Earth region, the basin of the middle and low Don, the Middle and Low Volga regions, and the North Caucasus (Rudenko, 1958). Minimal precipitation in the vegetation period was observed in an area between the Low Volga and Urals, at about 35 percent of the norm. The weather in 1938 was remarkable for the very high temperatures in the northern part of European Russia. In the drought of 1938, the average temperature in July in Leningrad was over 21 degrees (3.5 degrees above the norm), and a maximum of 30 degrees was reached, a temperature more characteristic for regimes in southern latitudes (Buchinsky, 1974). It was also reported that in Moscow province such intense dry weather and drought had never been observed before (Zavarina, 1954). The decline in grain production in 1938 was more than 11 percent, as compared with 1930 (official figures).

In 1939 the center of the drought was located in an area to the east of the river Volga. This continuing spring/summer drought also covered southern and southeastern parts of the Ukraine, the northeastern districts of the North Caucasus, the eastern part of the Central Black Earth region, and Volga-Vyatka. Only about 30 percent of the normal

amount of precipitation during the vegetation period was observed on the right bank of the Volga (Rudenko, 1958).

5.3. Food problems

One of the principal problems in reviewing the food situation in the 1930s is that official Soviet data on agricultural production cannot reliably be used for the analysis. It is widely accepted that the exaggeration of the actual size of the grain harvest reached 20 to 30 percent in official Soviet statistics in the 1930s (Wheatcroft and Davies, 1994a), although the distortion could be even larger. Conquest (2002) refers to one writer (in the Soviet paper *Izvestia*, 21 September 1933) saying that “in most cases the threshings (the actual grain obtained at the farm) proved to be 30, 40, or 50 percent lower than the estimated ‘biological crop’”.

The enormous distortion of official data on grain yields is confirmed by the KGB materials. One Soviet local party official, in his letter to the Politburo dated 12 September 1933, for example, gives some remarkable concrete examples of the exaggeration of official estimates of yields. In one district of the Low Volga region, the state commission on yields estimated the average yield at 5 centners per hectare, although field samples showed 3.6 centners per hectare only and data after threshing showed only 2.2 centners per hectare. In the Middle Volga district, the spring wheat yield was estimated by the commission at 6.2 centners, but field samples (just before harvesting) showed only 3.7 centners per hectare (Viola, Danilov, and Manning, 2002: 791). Thus there could be as much as a 40 to 50 percent difference between the estimates made by the state commission in the spring, and field sample estimates from the harvesting season. Although the State Planning Committee (Gosplan) also concluded that the estimates of the state commission were exaggerated, it made only very moderate corrections (by 7.5 percent) to their data (Viola, Danilov, and Manning, 2001: 794).

The aim of the official figures for yields was to estimate not actual harvests but optimal ones. To achieve this meant fighting to limit losses during all stages of grain production. The commission admitted that about 10 percent of losses took place during harvesting, threshing, transportation, and storing. If losses were any higher (for example, 20 percent), the commission regarded them as the result of sabotage by hostile forces (*ibid.*: 790). This position was clearly expressed by the high-rank-

Table 5.9.1. Number of reports about food crises and mass famine, 1928–1935*

Year	1928 /29	1929 /30	1930 /31	1931 /32	1932 /33	1933 /34	1934 /35
North	2/0						
Northwest	4/1						
Central	3/0						
C. Black Earth		1/0		2/0	1/1	4/0	
Volga-Vyatka		2/0		2/1		5/1	1/0
Middle Volga		2/2		4/4		1/0	
Low Volga				3/3	7/7	1/1	
Urals		4/3		3/1	2/1	5/0	
N. Caucasus	2/0	3/2		5/2	6/5	1/0	3/0
West Siberia		1/1		5/5	1/1	1/0	
Ukraine	4/2	5/3		8/7	10/10	4/3	5/0
All regions	15/3	18/11	0/0	32/23	27/25	22/5	9/0

* The numerator shows the total number of reports, including those on food shortages (food crises) and those on mass famine. The denominator indicates only reports on mass famine when deaths caused by famine were observed.

Source: Viola, Danilov, and Manning (2000, 2001, 2002).

ing Soviet official V. Molotov in March 1934. He said that the estimation of the “biological yield” was needed to combat the excessive losses of grain in a kolkhoz. There was no reason to estimate “barn yield” from the point of view of state interest. From his statement it can be seen that a kolkhoz had to find a way to limit losses, otherwise it would suffer most because it would incur grain shortages after the state provision (Viola, Danilov, and Manning, 2002: 74). This position makes clear the difference in Soviet statistics before and after 1933. Until 1933, Soviet grain data had certainly been exaggerated but they relied to some extent on field data that was subject to a certain correction (in the case of poorer weather in the summer), although not much. After 1933, it appears from the published data that planned targets were based on the estimate of “biological” (potential) yields rather than actual data. As Conquest put it, “Soviet statistical methods gradually lost their connection with facts” (2002).

Because of the lack of reliable statistical data, historical documents remain the main source of information about food problems. The KGB materials (Viola, Danilov, and Manning, 2000, 2001, 2002) serve here

Table 5.9.2. Official data on the grain reserve per capita per annum (kg) remaining after grain procurement in the major regions of the USSR, 1928–1933*

Regions	Population	1929 /30	1930 /31	1931 /32	1932 /33	1933 /34
Central Black Earth	13.7	515 (398)	539 (399)	485 (310)	517 (no data)	543 (no data)
Volga-Vyatka	8.9	462	459 (409)	435 (365)	475 (no data)	564 (no data)
Middle Volga	9.4	360 (284)	454 (261)	353 (218)	480 (no data)	578 (no data)
Low Volga	3.9	848 (600)	1,017 (580)	738 (374)	837 (no data)	1,086 (no data)
Urals	5.1	714 (586)	928 (692)	336 (163)	699 (502)	833 (no data)
North Caucasus	6.9	790 (512)	972 (527)	1,042 (577)	851 (590)	1,177 (no data)
West Siberia	4.3	1,229 (947)	1,274 (928)	752 (507)	983 (no data)	1,568 (no data)
Ukraine	24	774 (615)	940 (786)	759 (421)	607 (435)	923 (684)

* The first figure is the grain reserve of a peasant before the procurement according to official statistics. The second figure (in brackets) is the amount of grain after the procurement campaign.

Source: statistical report *Selskoe khozyastvo SSSR*, 1936. The size of the grain deliveries for some regions is available in Viola, Danilov, and Manning, 2000, 2001, 2002.

as the main source of information for the period 1928 to 1936. Conquest's book *The Harvest of Sorrow* (2002), as well as works by Davies (1980), and Wheatcroft and Davies (2004) are valuable sources of many details about the history of mass famine (or "famine-terror", as Conquest puts it) at the beginning of the 1930s.

Table 5.9.1., based on the KGB reports, reveals that a permanent food crisis existed in the USSR during the first half of the 1930s. The single exception was 1930, when no reports about food problems are found in the KGB materials. If the historical evidence is compared with official statistics on grain production, recalculated on a per capita basis, or on the grain surplus (Table 5.9.2.), it becomes obvious that official

statistics by no means reflect the actual food situation in the economic regions of the USSR. According to Soviet norms a region faced the threat of mass famine if grain production per capita was less than 165 kilograms. About 300 kilograms is quite a sufficient amount for a peasant for one year. As we can see, there is no indication of a food crisis or famine in the economic regions (with the single exception of the Urals region in 1931). On the contrary, most regions, even after grain procurement, should have been able to retain a large grain surplus. The official data for the Ukraine for 1932–1933 presents the most striking example. This region, in which millions lost their lives in the great famine of 1932–1933, was characterized by a grain reserve of 435 kilograms per capita remaining after grain procurement that year.

Food problems began in the USSR in 1928. The historical documents confirm that the failure of the grain procurement campaign in 1928–1929 (Table 5.1.) resulted in some food problems in the consumption zone of the USSR. In the late spring of 1929, a review of the food situation around the country, made by the KGB, named the most problematic regions, which included the northern, northwestern and central provinces, such as Pskovskaya, Vologodskaya and Arkhangel'skaya, Leningradskaya, Kaluzhskaya, Yaroslavskaya, and Vladimirskaya. The report states that the food problems were caused by relatively low harvests in the consumption regions and interruptions in bread imports from the production zone of the country. It was mostly the rural population that faced food problems (as urban populations were already subject to rationing). The report states that the food problems had already begun there in the early winter. It also states that several productive regions faced food problems, too. From the end of winter many provinces of the Ukraine suffered from food shortages, but the situation in the Northern Caucasus was said to be satisfactory (Viola, Danilov, and Manning, 2000: 875). Evidently, if some food problems existed in the production zone, they were less severe than in the consumption regions at that time.

The winter of 1929 saw the introduction of bread rationing in Soviet towns. The acuteness of the grain supply situation was such that in the spring of 1929 a top Soviet official (Rykov) proposed the importing of grain, although this proposal was rejected after a “very heated discussion” (Conquest, 2002). These food problems probably forced Stalin to come to his ultimate decision to resolve the problem of state grain procurement once and for all.

The results were already apparent in the following year, 1929–1930, which, while not producing a bigger harvest than 1928, was much more effective with respect to state grain provision. The new grain procurement campaign of 1929–1930 started in as early as August and the targets were very high. In the Ukraine, 896,000 tons of grain, or 23.4 percent of the planned amount, had already been collected by September (Viola, Danilov, and Manning, 2000: 949). In some other regions (the Urals and the Central Black Earth region) the implementation rate of the campaign was three to four times lower. In autumn the element of repression unfolded on a large scale and brought some results. By 25 December 1929, the amount of grain collected already reached 13.6 million tons (84.5 percent of the planned amount). This figure is twice as high as that for the end of 1927 (5.2 million tons) and 1928 (6.3 million tons). The champions of this grain procurement campaign were the Ukraine (4.6 million tons in 1929 and only 0.9 million tons in 1928) and the Central Black Earth region (1.7 million tons in 1929 and just 0.5 million tons in 1928) (*ibid.*: 93).

At the beginning of winter 1930, the grain procurement campaign was conducted in parallel with the start of the “dekulakization” and collectivization campaigns. Neither political campaign had any beneficial economic effect, despite the further demolition of the food market, and they became major factors in the deterioration of the social situation in the country. Table 5.9.3. (compiled by the KGB itself) shows that from February 1930 the dissatisfaction of the masses became very intense. However, in the winter, food problems were not yet the main reason for peasant protests.

In the spring of 1930 peasants began leaving their kolkhozes because the size of the grain quota for kolkhozniks was higher than for individuals. Reports then appeared about food shortages. The first came from Bashkiria (Urals) on 26 March 1930. It stated that many kolkhozniks were consuming substitute foods (such as orach, a small herbaceous plant or shrub) and that some cases of disease caused by the famine had been observed. One of the main indicators of the food crisis was the mass slaughtering of livestock in the winter of 1929–1930. The KGB report recognized that the main cause of the crisis was excessive grain procurement (Viola, Danilov, and Manning, 2000: 352). By the end of May and early June 1930, numerous KGB reports made mention of famine in the Middle Volga, Ukraine, Urals, and Siberia. Some cases of death as a result of famine were reported in the regions, but the main

Table 5.9.3. Number and cause of mass protests in rural areas of the USSR in 1930

Month	Number of protests	Collectivization	Dekulakization	Cause of mass protests				
				Closing of churches	Harvesting and sowing campaign	Food procurement	Tax campaign	Food problems
January	402	158	68	159	7	2	—	4
February	1,048	723	178	103	19	2	1	9
March	6,528	5,010	749	514	160	2	5	65
April	1,992	789	457	391	147	—	2	172
May	1,375	284	338	126	154	3	1	433
June	886	175	214	69	37	4	1	348
July	618	170	177	38	9	29	2	141
August	256	50	61	25	7	73	1	17
September	159	12	40	10	2	65	3	9
October	270	6	33	23	1	173	11	9
November	129	3	17	12	1	67	3	10
December	91	2	7	17	—	36	11	3
Total	13,754	7,382	2,339	1,487	544	456	41	1,220

Source: Viola, Danilov, and Manning 2000: 802.

indication of food shortages was still the consumption of substitute foods and the numerous protests against the authorities. The original Table 5.9.3 shows that the crisis peak occurred in May and June when the food problems overshadowed even problems associated with forcible collectivization and the repression and deportation of the “kulaks”.

The harvest in the following year, 1930, was the best for many years. During that year the authorities increased the planned grain procurement on at least two occasions, as they were aware that the peasants still had a grain surplus (*ibid.*: 633). The KGB materials mention several times that the harvest of 1930 was particularly good but also that a large part of it was not harvested due to “a specific condition” in the country that year (Viola, Danilov, and Manning, 2001: 407). A “specific condition” can be understood as including a new wave of collectivization, which started in the autumn of 1930. By September 1930, heavy pressure was being put on individual peasants through large individual grain quotas and other methods. By such means, and also by a renewal of physical pressure, the last half of 1930 saw a reversal of the flow from the kolkhozes. The second wave of dekulakization was one more “specific” factor. The whole situation in rural areas, especially in regions which had been determined as areas for complete collectivization in one

to two years (the Northern Caucasus, Middle Volga and Low Volga), was very tense. By continued use of force and economic pressure, the collective farms gradually took over in major grain-producing regions.

Despite high grain quotas and problems with harvesting, no food crises in rural areas were reported in 1930. It is likely that the harvest of 1930 was very good and that it was higher than the Western estimate of 65 million tons. Only a few indicators of food shortages can be found in the KGB materials, and then only in urban areas. In March 1931 the authorities had to find ways to economize on bread. The list of categories of the urban population to be supplied with rationed food became shorter. For example, in the North Caucasus 600,000 were taken off the list (*ibid.*: 101). One of the reasons for the food problems seems to have been the too rapid growth of the urban population. Between 1929 and 1932, some 12.5 million new workers entered industry, 8.5 million of whom were from rural areas. This increase in the urban population meant, among other things, that more food was needed to supply them. Twenty-six million urban persons were provisioned by the state in 1930. In 1931, the number rose to 33.2 million, or nearly 26 percent. The increase in grain earmarked for their consumption was only 6 percent (Conquest, 2002).

In 1931, the large-scale drought affected some key grain-producing regions and grain production was significantly lower than in 1930 (by 17 percent according to official figures). However, the grain procurement for that year was determined at a higher level than ever before. The amount of grain available for peasants after state procurement was already 20 percent less than in 1930. The grain remaining was inadequate and seemed to give little chance for the peasants to escape famine.

The first KGB report warning about the approaching food shortage in the Middle Volga came as early as the end of September 1931. The report gave a detailed analysis of the food situation in the region. Twenty-seven of the 35 districts located in the area most affected by drought on the left bank of the river Volga had no grain surplus. The report appealed to the central authorities to revise their grain-procurement plan for the region to 1.3 million tons, which could be collected exclusively in the districts where a grain surplus existed (Viola, Danilov, and Manning, 2001: 183). Although this had been done, three months later, in December, information filtered through about a famine in the Middle Volga region. Many cases of the consumption of substitute foodstuffs and some cases of death as a result of famine were registered (*ibid.*: 327). It

was reported that in some kolkhozes the proportion of households wanting to leave the collective farms reached 70 to 80 percent. Also, from October, 162,400 peasants left the region for other regions of the country. Such large-scale migration of peasants was typical for all regions that suffered from the drought of 1931.

The exceptionally dry weather in the Low Volga region lasted only about ten days in 1931. However, the average yield (official figures) reached only 3.8 centners per hectare, while in 1930 it had been about 6 centners per hectare. However, the plan for state provision increased from 1.5 million tons in 1930 to 1.9 million tons in 1931 (*ibid.*: 203). From December 1931 an acute food crisis began in the region as a result of excessive grain procurement. It was reported that many local peasants consumed substitute foodstuffs and dead animals, and several deaths were also registered (*ibid.*: 328). About 33 percent of peasants who were still farming on individual farms had to leave the region. By the spring, 21 percent of working horses had been lost because of lack of forage (*ibid.*: 329).

In Volga-Vyatka a food crisis was reported for the first time in March 1932. Some cases of the eating of substitute foods were observed. The reaction of the peasants to the food crisis was mass migration from the kolkhozes. After October, thousands of households left the kolkhozes and the number grew month by month. In October the number of households (peasant families) that left the kolkhozes was 926, and in February it reached more than 14,000 (*ibid.*: 326). In Bashkirskaia, the food shortage became evident in the republic in February 1932. Some families on the collective farms were starving. In one kolkhoz, deaths among the cattle reached ten heads per day because of lack of forage. It was reported that on average the peasants had only 83 kilograms of food grain per capita, while the Soviet “hungry norm” was 165 kilograms (*ibid.*: 270). However, state provision for the region reached 480,000 tons (38 percent of the official grain production). That amount would give an additional 94 kilograms per capita, if no grain was expropriated.

In the Central Black Earth region, the first indications of food problems were registered in mid-February 1932. It was reported that many peasants ate surrogate foods (*ibid.*: 318). Large-scale losses of working horses were observed there because of a lack of forage. In some districts of the Northern Caucasus the food situation was drastic in March. Thousands of cases of disease caused by malnutrition were registered. The share of collectivized households decreased from 85 to 80

percent (the region was a leader with respect to collectivization) during those few months. About 25,000 peasants left for other regions to find jobs and food (*ibid.*: 331). Similar reports came from the Urals and Tatarstan.

In the spring of 1932, a food crisis was also reported in Western Siberia. A report from one district there described some cases of eating dead animals (*ibid.*: 291). At the end of March a special commission investigated the situation and confirmed that many peasants from local *kolkhozes* were using such dead animals for food. Many families were recorded by the commission as starving. Later it was reported that incidents of the eating of substitute foodstuffs and dead animals had become much more common (*ibid.*: 345). Western Siberia had realized its planned target for grain deliveries but the harvest was very poor and grain procurement left peasants without any grain at all (*ibid.*: 313). The official figures presented in Table 5.9.2. show that, even after state grain procurement, peasants of the region had more than 500 kilograms per capita, which shows how distorted the Soviet statistics could be.

The development of the food situation in the Ukraine is of great interest in view of the catastrophic famine the following agricultural year (1932–1933). In normal circumstances, the Ukraine and the North Caucasus provided half of the total marketable grain. In 1931, the Ukraine emerged as the major grain procurement region as well. While the amount of grain procured in the republic reached 7.4 million tons in 1930, in 1931–1932 the plan increased to 8.2 million tons, despite the harvest being poorer than in the previous year (according to official data). This increase was earmarked for export. Additional amounts of grain were needed to make up for the financial shortfall that had resulted from the fall in the grain price on the world markets (*ibid.*: 198).

In the last days of October it was reported that the grain provision campaign in the Ukraine had proceeded at a higher rate than in 1930. During a special meeting of party leaders devoted to the grain procurement campaign in the Ukraine, the possibility of increasing the grain procurement plan was discussed. The main argument was that in the previous year, after grain procurement, Ukrainian peasants still had “a considerable grain reserve”. At the same time, local party officials recognized that the harvest of 1931 was worse than in 1930 because the spring crop had been badly damaged by the drought. One local official said that no actual figures for the harvest of 1931 were yet known, and he added that it was hardly possible to determine a reliable figure at this

stage. Nevertheless, the plan to collect 8.2 million tons was considered absolutely realistic. This planned target was again confirmed at the end of December 1931 in a special resolution of the Ukrainian Communist Party. The plan was said to be “absolutely necessary” for the whole economy of the USSR (*ibid.*: 227). The resolution again called the plan realistic and criticized the fact that the rate of grain procurement had slowed during the last decades. By the end of December 1931, 79 percent of the planned amount of grain had already been collected, but this figure was lower than in the corresponding period of 1930. The resolution called for the undertaking of a “decisive effort” to meet the planned target.

By the end of March 1932, a KGB report reviewed letters from peasants to the Soviet papers, many of which were devoted to the mass famine in the Ukraine (*ibid.*: 312). A letter to one Soviet paper from a peasant in the Central Black Earth region stated that crowds of starving Ukrainian peasants had invaded the region to sell their clothes and other goods in order to buy food. The peasants argued that grain provision had left them without any grain reserves. In April the KGB reported acute food shortages in some villages of the Ukraine. Many associated diseases and several cases of death were registered. The state of the livestock was reported to be extremely poor. Deaths of working horses were observed on a mass scale because of the lack of feed grain. Throughout the region about 50 percent of horses were no longer capable of being used for farming operations because of their poor physical condition (*ibid.*: 318).

The food crisis in the Ukraine extended into the summer of 1932 as well. In mid June 1932, a KGB report drew attention to the dramatic food situation in the Ukraine. In some districts there was actual famine and the report recognized that it was a result of the grain procurement campaign (which the authorities were forced to halt only at the end of March). Numerous cases of death as a result of famine were registered. In some villages half of the local population suffered from malnutrition. No dogs or cats could be found in Ukrainian villages, and masses of peasants ate grass and dead animals (*ibid.*: 389). Another report stated that in some areas deaths and suicides as a result of the famine had been registered. A few cases of cannibalism were also registered. According to the report, all these factors had an impact on the rate and quality of the next sowing campaign (*ibid.*: 420). An informal source said that a large proportion of arable land (estimated at 50 percent) was left unsown because of shortages of seed, labor, and other resources (*ibid.*: 407).

In the spring and summer of 1932, the Soviet authorities undertook some steps to relieve the food crisis in the USSR, but they were insufficient. In March a resolution was adopted regarding the cereal balance in the USSR. The resolution obliged all local authorities to reduce cereal consumption to a minimum norm as the grain deficit became a serious problem for the country as a whole (*ibid.*: 257). On 9 April 1932, a further resolution was adopted by the Central Committee that contained a proposal to return grain allocated for export from ports and to purchase 160,000 tons of grain abroad. In May 1932, the Soviet Union purchased 48,000 tons from Canada in order to supply bread to Eastern Siberia and the Far East, where a food crisis had also occurred (*ibid.*: 365). A decree of 6 May 1932 permitted private trade in grain by collective farms and collective farmers after state quotas had been fulfilled (Conquest, 2002). In June 1932, the Soviet authorities revised the plan for grain procurement for some regions and permitted peasants to sell their agricultural products on a free market (Viola, Danilov, and Manning, 2001: 382).

At the same time, the Soviet authorities seem to be satisfied with the results for that year. On 7 July 1932 the Central Committee of the CPSU adopted a resolution concerning the results for the grain procurement campaign in 1931–1932, which said that, regardless of the drought affecting many agricultural regions, 22.4 million tons had been collected while in 1930 the figure had been only 21.6 million tons. It was claimed that this success had been achieved on the basis of a victory of the *kolkhoz* system and the defeat of kulaks in the Russian villages. One month later, the collectivization of peasant households in key regions was announced to be complete.

In the critical year 1932, the USSR's total grain crop was no worse than that of 1931. The problem was that Soviet agriculture had not yet recovered from the famine of 1931, while the state policy had become even harsher. The Ukraine is the most striking example of this. In spring 1933, a catastrophic famine killed millions in the Ukraine. In 1932, this region faced lower harvests than in 1931, and despite the grain quota being halved (from 8.2 to 4.2 million tons), peasants were not able to reserve any more grain than in 1931. The fact that in 1932–1933 the Ukraine (and some other regions) experienced a much larger famine than in 1931 should be attributed exclusively to certain of the concrete political decisions adopted by the Soviet authorities during that disastrous year.

On 7 August 1932, a resolution of the CPSU “On the safeguarding of state property” (drafted by Stalin himself) was adopted. It ordered that all collective farm property, such as cattle, standing crops, and agricultural produce should be so defined. This law (known popularly as the “law of three ears”) was famous for its severity. It decreed that offenders were either to be shot, or, in extenuating circumstances, imprisoned for not less than ten years, following the total confiscation of their property. During 1932, 20 percent of all sentences passed in the USSR were in connection with this decree (Conquest, 2002).

Faced with a decline in the amount of grain procured in the late autumn of 1932 (by 1 November only 41 percent of the delivery plan had only been fulfilled) the party adopted measures against local officials in the Ukraine. Soon 237 secretaries of party district committees and 249 chairmen of district executive committees had been replaced. At the same time, 10,000 fresh activists were given permanent employment in the villages, including 3,000 named chairmen of collective farms, as well as party secretaries and organizers. At the same time, the pressure on the peasants increased. Decrees issued on 22 August 1932 and 2 December 1932 determined sentences of up to ten years in concentration camps for those who sold their grain before the fulfillment of the state plan (*ibid.*). On 29 December 1932, a directive issued by the Politburo concerning the withdrawal of seed fund for failure to fulfill the grain-delivery plan (in the Ukraine) was adopted. The directive ordered all seed from kolkhozes to be withdrawn in five to six days following failure to meet the planned targets (Viola, Danilov, and Manning, 2001: 611).

A decree adopted by the Politburo on 22 January 1933 played an especially grim role in the emergence of mass famine in 1933 in the Ukraine. This directive ordered local authorities to prevent starving peasants from leaving their regions. It stated that in 1932 a serious mistake had been made by local authorities as they had tolerated a large-scale migration of starving peasants from affected regions. This information on the mass migration of peasants from their villages was used by internal and external enemies for “counterrevolutionary” propaganda (*ibid.*: 635). Another resolution detailed certain measures that were to be undertaken for the implementation of the 22 January directive. Among them was a ban on the sale of railway tickets to peasants unless they had special permission to leave the region (*ibid.*: 635). A month later, a new Politburo resolution also sanctioned the implementation of the resolution of 22 January in the Low Volga region (*ibid.*: 644). These resolu-

tions were adopted at a time when many peasants were about to leave the famine-torn regions. In the Ukraine, in as early as mid-1932, almost three million people were on the move, crowding the stations, trying to get to the towns and seeking more prosperous areas (Conquest, 2002). Special troops were deployed to prevent these peasants from leaving.

The first KGB report² about mass famine in the Ukraine is dated 16 February. It states that mass famine was developing in some provinces (Kievskaya, Vinnitskaya) of the Ukraine. The KGB monitored the development of the food crisis in the Ukraine during the winter and spring. Conquest (2002) states that people had been dying all winter, but death on a mass scale really began in early March 1933. On 1 March 1933, the KGB compiled detailed statistics on the starving population of Kievskaya province in the Ukraine, where 829 villages were recognized as being affected by famine. The total number of suffering families amounted to 26,525. The number of starving adults reached 93,636, and the number of children 112,199. It was reported that more than 47,000 people had swollen faces, legs, and stomachs. The peasants were eating anything at all—mice, rats, sparrows, ants, and earthworms. About 12,800 peasants died as a result of the famine. Seventy-two incidents of cannibalism and 65 incidents of the eating of corpses were registered in the province. The total grain aid from the state was 1,614 tons, which, with the total number of starving peasants in the province estimated at 206,000, provided only 8 kilograms per person (Viola, Danilov, and Manning, 2001: 646). Similar reports came from Donetskaya, Dnepropetrovskaya, and other provinces of the Ukraine during March and April. The majority of the starving were members of collective farms rather than individual farmers (*ibid.*: 653).

At that time, thousands of starving peasants tried to get to the republic's towns. In Kiev, Kharkov, and other big cities, the local authorities had to clear the corpses from the streets every morning. For example, in the city of Poltava in the spring of 1933, the number of dead bodies found in the street reached 150 a day. It was hard work for the state doctors, who were obliged to invent a large spectrum of diagnoses (which include the ironic "sudden illness") in order to hide the real cause of the mass deaths in the Ukrainian towns (Conquest, 2002).

Nor was it only the Ukraine that was affected by mass famine. In March 1933, there were reports of famine in the Northern Caucasus. In many villages peasants ate dogs, cats, and rats, and some cases of cannibalism were also registered in the region (Viola, Danilov, and Manning,

2001: 648). In late March, information about many cases of famine among members of kolkhozes came from the Low Volga, Central Black Earth, and Urals regions. One KGB report confirms that medical workers were afraid to register famine as the cause of death and entered alternative diagnoses in official documents (*ibid.*: 658). Reports about famine in all these regions became especially numerous in May 1933. There were increasing numbers of reports of mass famine in the North Caucasus, Low Volga, Central Black Earth region, and the Urals. A critical situation was still developing in May in two regions—the North Caucasus and the Ukraine.

It is difficult to say exactly when this mass famine came to an end in 1933. Conquest states that “by the end of May observers noted a virtual end of the deaths by famine on a mass scale, though the death rate remained abnormally high” (2002: 262). Some modern Russian demographers argue that everywhere the rapid increase in mortality had started no earlier than March and that it was more limited in its duration than many experts had previously believed (Andreev, Darsky, and Kharkova, 1998). The last KGB reports about a mass famine in the Nemkommuna province (German Commune) of the Low Volga are dated 1 and 4 June.

It is likely that even these KGB materials are incomplete. It is worth noting that there were three to five times fewer reports from the regions concerning famine in 1932–1933 than in 1921–1922, despite the food crisis being on the same scale (compare Tables 4.5. and 5.9.1.). It seems that in 1933 any information about famine had a more limited distribution at all levels of the Soviet bureaucracy than in the 1920s. No official wanted to emphasize the existence of famine in his report. No word about the famine was allowed to appear in the press, and the Soviet authorities used a very effective policy to misinform the world about the food situation in the country (after visits to the country some famous Western writers confirmed that there was no food crisis in Russia). Certainly, by the end of the summer the famine had abated in the USSR. The ban on foreign correspondents visiting the Ukraine was lifted in the autumn of 1933 (Conquest, 2002).

The total number of human deaths during the great famine of 1932–1933 is still debated. The problem is associated with the incomplete registration of deaths by famine in the conditions of the 1930s. The higher the number of deaths by famine, the more incomplete the demographic statistics. Modern Russian experts estimate that in 1933

about 70 percent of deaths by famine were left without documented registration. According to many experts the total number of deaths as a result of famine in the Ukraine was 4 million, and a comparison of this figure with the official statistics gives 68 percent of non-registered deaths in the region in 1933. Based on this estimate, the total number of lives lost through famine in the Russian Federation could have reached 2.15 million people. A geography of excessive mortality in the Russian Federation highlights mainly the North Caucasus and Low Volga (Andreev, Darsky, and Kharkova, 1998). Figures presented by Western experts are close to this estimate: for the Ukraine 5 million; for the North Caucasus 1 million; and 1 million in other regions of Russia. Thus the total number of famine victims reached 6 to 7 million (Conquest, 2002). These are enormous figures, comparable to the number of deaths in the major wars of our time.

The catastrophe of 1932–1933 shows that the repressive policy against the peasants undermined the prospects for agricultural development in the country. During the winter of 1933, the authorities had in fact already been preparing for a reversion to the normal methods, at the very time when the starving in the Ukraine were being denied help. On 19 January 1933, a new law established a simple grain tax (on land actually under cultivation) instead of grain collections, although this did not come into force until later. On 18 February 1933, permission for the introduction of grain trading in Kiev and Vinnytsia provinces was granted. Grain collection in the Ukraine was officially halted at last on 15 March 1933, and orders were given to release some grain from the army reserves to the villages (*ibid.*). On 8 May 1933, a decree was adopted about the immediate halting of any mass deportations of peasants and the “putting in order” of arrest procedures. The resolution demanded a reduction in the number of people kept in concentration camps from 800,000 to 400,000 (by the revising of their sentences) (Viola, Danilov, and Manning, 2001: 749).

By the beginning of 1934 there was relative stability in Soviet villages. However, in the spring of 1934 the food situation in the country was again unsatisfactory. Many cases of malnutrition, disease, and even deaths as a result of famine were reported from the Central Black Earth, Ukraine, Volga-Vyatka, and Urals regions (Table 5.9.1.). The prosecutor’s office reported the mass slaughtering of livestock in some consumption provinces. In March and April 1934, the size of herds fell by 20 to 30 percent in several areas. The report stated that, according to

collective farmers, a shortage of fodder was the main cause of the slaughter (Viola, Danilov, and Manning, 2002: 95). Reports about food problems in the same regions can be found even in July 1934 (Volga-Vyatka, Ukraine, Central Black Earth, Middle Volga, Urals). For example, in the Black Earth region and Middle Volga, a few cases of death as a result of famine among kolkhozniks were registered (*ibid.*: 197). The food crisis of the spring and summer of 1934 was to some extent a repercussion of the catastrophe of 1932–1933 (Moshkov, 2002). According to Andreev and others, excessive mortality among Soviet people reached its peak in the spring of 1933 and decreased to normal levels only one and a half years later, or by the end of 1934 (Andreev, Darsky, and Kharkova, 1998).

The KGB materials do not contain reports about famine in 1935, other than a few reports indirectly indicating that some food problems existed (for example, local authorities complained of peasants leaving their villages for urban areas because of food problems). The food rationing system was abolished in the USSR in 1935. The harvest of 1935 was one of the best, but the following year, 1936, brought the worst harvest of the decade. The drought of 1936 affected many grain-producing regions of Russia and was even worse than in 1931 (Figure 5.3.). According to official Soviet data (revised in the 1960s), grain production in 1936 was significantly lower than in 1931. The KGB reported a fodder shortage in the country and the dramatic reduction of cattle in many regions, including the central part of European Russia, which was also affected by the drought. In the autumn of 1936 the food situation seems to have been acute. In many areas peasants were in a state of panic, seeing inevitable famine for the coming winter. They tried to slow down the harvesting as much as possible in the hope that the authorities would lower the planned targets. The reports also note the very low quality of the harvest, as peasants tried to leave as many plants in the fields as they could, a common tactic among peasants in previous famines in the 1930s. Many peasants left their villages for employment in urban areas and at new industrial construction sites. From February 1937, some reports emerged about cases of starving kolkhoznik families. However, no reports about mass famine can be found in the KGB materials for 1936–1937. It might be suggested that Stalin's government wanted, and managed, to cope with the food shortage in 1936. Experts point out that the government limited grain exports, wrote of peasant debts, deliv-

Table 5.9.4. Average food consumption in the USSR in the 1930s, as compared with 1913 (kilograms per annum)

Food staples	1913	1928	1930	1940
Bread	200	214	208	195
Potatoes	75	130	147	112
Vegetables	40	72	93	64
Milk	154	182	157	130
Meat	27	32	28	21
Eggs (unit)	48	60	49	59
Fish	6	3.5	5.4	4.9
Oil	-	2.6	2.4	2.6
Sugar	8.1	7.5	7.8	8.7
Total intake in Kcal./day	2,069	2,303	2,393	2,112

Source: Kiselev and Shagin, 1996.

ered seed and food credits, etc. (Moshkov, 2002). The most important measure was that the plan for grain procurement was determined at the lowest figure for the 1930s—about 12 million tons. (Wheatcroft and Davies [1994a] give a non-revised figure of 27.6 million tons as the planned grain collection, see Table 5.1. [Viola, Danilov, and Manning, 2002: 800]). For example, the Ukraine was obliged to deliver only 960,000 tons, a much lower figure than in 1931 (8.6 million tons) and 1932 (4.2 million tons) (*ibid.*: 829). If the procurement plan had not been radically revised, the repetition of mass famine would have been inevitable in many agricultural regions of the USSR.

While, fortunately, there was no recurrence of mass famine in Russia in the second half of the decade, the mass of Soviet peasants certainly suffered malnutrition. By the end of the 1930s, the average Soviet citizen was worse off than before the revolution. According to the cereal balance for the pre-revolutionary period, about 430 kilograms of grain was available for a Russian peasant before the war (Popov, 1925). In 1935, the official economist Strumilin found the average Soviet citizen consumed 261.6 kilograms of grain a year. The Soviet peasants ate approximately the same amount of bread, but less meat, fat, and dairy products. There was a deterioration in food consumption in the Soviet Union between 1930 and 1940, as even the official statistics indicate (Table 5.9.4.). Meat and dairy consumption fell between 1928 and

1940. In 1940, total food consumption was only 2,112 kcal per capita per day, which was considerably less than the Soviet physiological norm (2,400 kcal a day). For most kolkhozniks, their plot, tiny as it was, represented the vital resource for their physical survival.

5.4. Summary

The most remarkable feature of the period is the great distortion in statistics on agricultural production. It seems that none of the Soviet officials, including Stalin, knew the real size of harvests in the country. Within the top Soviet echelons a heated discussion took place between those who wanted to keep at least some (however shadowy) link to the field estimates and those who wanted to operate exclusively with the planned figures. Quite naturally the latter group gained the upper hand. The distorted statistics determined both the excessively high plan figures for the first five-year plan period (1928 to 1932) and the unrealistically high figures for grain procurement.

This race to achieve the unrealistic plan figures for grain delivery led to mass famine in the first drought of 1931. In the next years, 1932 and 1933, which were years of good weather, the excessive procurement of grain from devastated collective farms was the single cause of mass famine in the Ukraine and other productive regions. The authorities seemed to do everything possible to aggravate the situation. They prevented the starving peasants from leaving the affected regions, even though such migration had saved millions of lives in previous bad years. Many experts believe that this was deliberately conducted genocide against the Russian peasantry. However, there may be a simpler explanation. Stalin's pathological distrust of the peasants, completely false statistics, and a determination to hide information about food crises from the outside world could have brought about the catastrophe. There are some indications that the authorities themselves were bemused by the mass famine among kolkhozniks. After 1934 they tried to make a correction in their policy. In 1936, when the most severe drought affected the Soviet Union, the recurrence of mass famine was avoided due to a few elementary measures such as the radical reduction of the grain procurement plan (by 60 percent) and the halting of grain exports.

NOTES

- 1 In the Stalin era MTSs (Machine and Tractor Stations) were set up to provide kolkhozes with technical assistance in ploughing and other agricultural work. In fact, the MTS rather provided fiscal and political control over Soviet collective farms. Based in each MTS was a political deputy-director (until 1953), or a party secretary (1953 to 1957), who carried out political control functions. Usually, one MTS served a dozen kolkhozes. About 2,500 such stations were established between 1929 and 1932.
- 2 In this book we focus mainly on the major grain-growing regions of the USSR. In most national republics the situation in the 1920s and 1930s was too specific for our subject, due to nationalistic movements and nomadic traditions. It is for this reason that some national Soviet republics, although severely affected by food problems, are not systematically reviewed here. For example, the food situation in Kazakhstan was critical in the 1930s. In many cases the first reports of mass famine in the Soviet Union came from this republic. In May 1930, there were reports of a critical situation in Kazakhstan, where many peasants were consuming substitute foods and fallen animals. Reports then followed about food crises in other regions of the USSR. In 1932–1933 too, the very first report about mass famine in the USSR came from Kazakhstan in as early as October (and from the Ukraine in February 1933). There, all the typical indications of mass famine were observed: the majority of the local population were eating only substitute foods, the death rate was very high, and, according to the report, the proportion of the rural population needing emergency food aid reached 50 percent (or as high as 95 percent in some districts) (Viola, Danilov, and Manning, 2000: 527).

The post-war recovery period (1945–1954)

The target of the first post-war five-year plan was to reach the pre-war level of the economy. However, the process of economic recovery took about ten years. The strategies adopted by the Soviet authorities for economic and political processes hardly differed from those of the 1930s. The same forcible mobilization of human and material resources for the implementation of several grandiose projects, and the same harshness of Soviet legislation were all typical for the period. The last decade of Stalin's rule was still characterized by poverty for the majority of Soviet people (still mainly rural). Indeed, no modernization was proposed in this period apart from what was absolutely necessary. Although some progress was made after the war, by the end of this period stagnation had set in.

6.1. Major developments in agriculture

During World War II, Soviet agriculture experienced a severe decline. In the autumn of 1941, as the Germans invaded the south and west of the country, two-fifths of the whole Soviet wheat harvest and two-thirds of the potato crop area was lost. In 1942, the total amount of agricultural production under Soviet control had fallen by one-third. Because of the loss of the Ukraine and part of the Volga region, the cultivation of field crops shifted onto the inferior soils of the northern and eastern regions, although agriculture here was also subject to decline. The 1943 growing season was relatively unfavorable in terms of climate, and in spite of an increase in the sowing area, yields declined further (Harrison, 1994). In 1944, Soviet agriculture recorded the lowest figures in all agricultural production sectors since the beginning of the war. During the war, live-stock numbers experienced a dramatic decline. The number of horses dropped by 50 percent, that of pigs by 65 percent, and that of horned

Table. 6.1. Statistics for Soviet agriculture for the territory untouched by occupation, 1940–1944

Parameter	1940	1942	1943	1944
Area under crops (million ha)	72.7	77.7	66.4	59.0
Gross cereal harvest, barn yield (million tons)	57.7	60.4	51.0	45.1
Potatoes (million tons)	3.4	4.2	4.6	4.6
Meat, dead weight (million tons)	2.0	1.5	1.5	1.4
Raw cotton (million tons)	1.6	1.6	1.2	1.1

Source: Harrison, 1994; *Narodnoe khozyastvo SSSR in 1941–45*, 1959.

cattle by 20 percent (Vert, 1995). In absolute figures the losses of horses reached 7 million, cattle 17 million, pigs 20 million, sheep and goats 27 million, and poultry 110 million.

According to the fourth five-year plan (1946–1950), known as the plan for the “restoration and development of the economy of the USSR”, pre-war levels of grain production should have been achieved by 1950. The fifth five-year plan (1951–1955) targeted an increase in grain production by 40 to 50 percent (Kont, 1994). Neither target was achieved, although some progress was made after 1950. According to modern sources, the pre-war crop area of the Russian Federation had not yet been reached by the end of the post-war decade. The average cereal yield was still less than in the pre-war period. As a result, average grain production between 1950 and 1954 did not exceed the level of 1940 (Table 6.2.).

The development of the livestock sector is interesting as it is closely linked with the grain balance in the post-war period. According to Stalin’s statistics, grain production in 1948 almost reached the level of the pre-war period and the harvest of 1949 was already higher than in 1940. Moreover, it was officially announced that the “grain problem” had been resolved in the country and that there was a firm base for the further successful development of the grain sector. The low level of livestock production was said to remain the most serious challenge for Soviet agriculture (Karasev, 1951). An ambitious livestock program was

Table 6.2. The main development parameters for the agricultural sector in the post-war decade in the Russian Federation

Parameter	1940	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954
Grain production (million tons)	51.9	25.4	21.2	35.7	34.2	38.9	46.8	47.5	51.9	48.2	56.3
Crop area (million ha)	70.14	50.9	53.7	56.5	59.3	62.1	64.9	65.9	66.5	67.4	68.9
Yields (centners per ha)	7.4	5.0	3.9	6.3	5.8	6.3	7.2	7.2	7.8	7.1	8.2
Livestock (million standard units)	36	29	28	30	34	38	37	39	38	38	39
Milk (million tons)	17.8	16.6	16.9	18.6	20.6	21.5	21.5	21.5	21.3	21.1	22.0
Meat (million tons)	2.4	1.8	1.4	1.7	2.1	2.6	2.4	2.9	3.2	3.3	3.4

Source: grain production and livestock production—*Sel'skoe khozyastvo v Rossii*, 2000; crop areas for 1945 and 1950 are available in Soviet statistical reports for various years.

announced in the spring of 1949 in order to achieve a 1.5-fold increase in meat, milk, and egg production within three years. However, no increase in livestock numbers or meat and milk production was observed between 1949 and 1951. In fact, no great changes took place in the subsequent period either (Table 6.2.). The program also yielded very little additional food. Although by 1954 livestock production exceeded 1940 levels, it remained much lower than that of pre-collectivization times (in 1928 the number of livestock in the Russian Federation reached 50 million standard units, while in 1954 the figure was 39 million).

We suggest that the deficit in animal feed, mostly grain, was probably the main reason for this stagnation in livestock production, although the very poor state of other fodder was also a problem. Our estimation of the grain balance for 1945 to 1954 shows that the grain reserve was insufficient to support the proposed livestock program (Table 6.3.). In this estimate the figures for grain demand include three basic items—food for human consumption (0.2 tons per capita), seed (0.15 tons per ha), and animal feed (0.32 tons per standard unit), according to Soviet standards for the 1950s (Pelt, 1959). The most critical situation developed in the first post-war years (Figure 6.1.). Between 1945 and 1949,

Table 6.3. Estimates of the grain balance (millions of tons) in the post-war decade in the Russian Federation

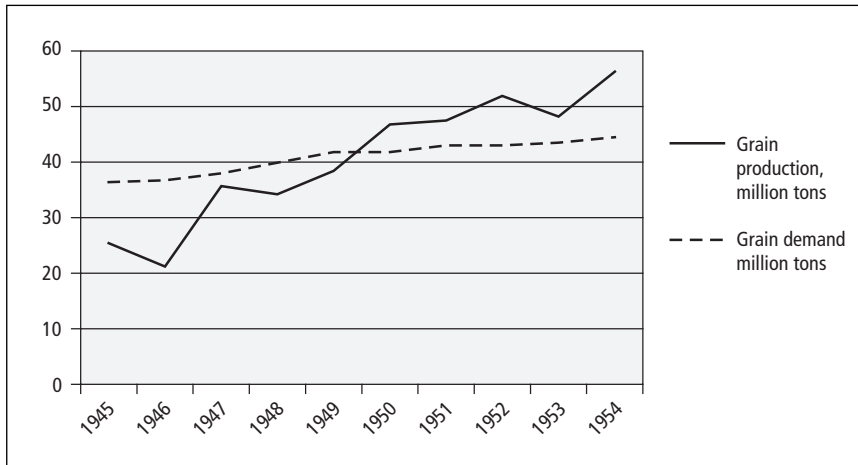
Parameter	Pre-war	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954
Crop area (million ha)	70.14	50.9	53.7	56.5	59.3	62.1	64.9	65.9	66.5	67.4	68.9
Population (millions)	111	–	–	–	–	–	101.4	102.9	104.6	106.7	108.4
Livestock (million standard units)	36	29	28	30	34	38	37	39	38	38	39
Seed (million tons)	10.5	7.6	8.1	8.5	8.9	9.3	9.7	9.9	10	10.1	10.3
Food (million tons)	22.2	19.5	19.7	19.9	20.1	20.3	20.3	20.6	20.9	21.3	21.7
Feed (million tons)	11.5	9.3	8.9	9.6	10.9	12.1	11.8	12.5	12.1	12.1	12.5
Total (million tons)	44.3	36.4	36.7	38.0	39.9	41.8	41.8	43.0	43.0	43.5	44.5
Grain production (million tons)	51.9	25.4	21.2	35.7	34.2	38.9	46.8	47.5	51.9	48.2	56.3

Source: grain production (dry weight) and livestock inventory *Sel'skoe khozyastvo v Rossii*, 2000; crop areas for 1945 and 1950 are available in Soviet statistical reports, for the other years the data are extrapolated.

a chronic grain deficit threatened not only the livestock sector but also food supplies for the Soviet people. From 1949, the grain balance became positive, but only slightly. If livestock production had grown as planned (a 1.5-fold increase in three years), the country would have faced a grain shortage by 1951. The Soviet authorities had to make a choice between bread and meat. The Soviet authorities needed a large surplus of grain in order to support its new allies in Eastern Europe and to fill the state grain reserves (up to 10 million tons). The threat of grain shortages because of livestock growth was always there. Indeed, immediately after Stalin's death in 1953 there was a rapid and quite dramatic switch to livestock farming, causing a grain crisis within six months.

The overall reason for the poor performance of Soviet farming was that no radical change took place in the management system of agriculture. State expenditure on agriculture was negligible while kolkhozes and sovkhoses suffered from permanent administrative pressure. The

Figure 6.1. Grain production and estimated basic grain requirements in the RSFSR, 1945–1954



influence of the state and party was still exerted through the MTSs. The MTSs carried out contract work for supervisory agencies on behalf of the state. Each MTS had a political deputy-director (until 1953) or a party secretary (until 1957) based in it, for the carrying out of political control functions. Unlike the *kolkhoz*, the MTS was wholly budget financed and was not an “economic accounting” organization (Nove, 1969). The collective farms paid for MTS work almost wholly by deliveries in kind, based on a valuation of various operations, in terms either of a given quantity of produce or a stated share in the harvest. As in the 1930s, very little was left for the *kolkhozes*’ own consumption in post-war times.

The real income of Soviet consumers was still below that of 1928, the year of collectivization, but the peasants were in a considerably poorer condition and the living standards of the rural population did not reach pre-collectivization levels until several years after Stalin’s death (Goldman, 1968). This caused the mass migration of peasants into urban areas despite all attempts by the Soviet authorities to control the process. Between 1946 and 1953, about 8 million peasants left their villages for industrial centers, and many *kolkhozes* already faced labor shortages. In 1950, Nikita Khrushchev, then head of the Ministry of Agriculture, carried through an amalgamation of collective farms resulting in the 250,000 collective farms being reduced to 123,000. He also

sponsored proposals for the removal of collective farmers to new town centers, so-called *agrogoroda* (agricultural cities), which would have led to the urbanization of the peasants, putting them under total party control, and the eventual elimination of their private holdings. Fortunately, this proposal was rejected by the leadership at the XIXth Party Congress (1952).

One more specific factor should be mentioned to illustrate this period. The first post-war years were marked by a new wave of ideological fighting in Soviet science. In 1948, for example, genetic and other important developments were officially condemned as “bourgeois” theories. Instead, often strange and fantastic concepts appeared and were successfully backed by Marxist philosophers. Some of the concepts were applied to Soviet agriculture as they promised to resolve problems once and for all. One project, which was named “The Great Stalin Plan for the Transformation of Nature”, was adopted in the autumn of 1948. The main target of this plan was to combat droughts in the steppe and wooded steppe zones of European Russia by planting several giant shelter belts and constructing large irrigation channels and water reservoirs. The Great Stalin Plan was to be implemented over three to four years, and more than 5,000 kilometers of shelter belt were to be planted in the southern part of the country. From 1948 to 1953, the number of trees planted in the country exceeded the number planted during the previous 250 years of Russia’s forestry history. However, by the autumn of 1956, the proportion of healthy trees in these belts reached only 4.3 percent. The main reason was the adoption of an erroneous technique by academician T. D. Lysenko. He proposed that trees (oaks, for example) should be planted in very compact groups, which he called the “nest” method of planting. According to his concept, plants belonging to one species did not compete with one another but even collaborated (against weeds and other common enemies). The failure of the plan cost an enormous amount of money, and after 1953 no mention of the plan was found in the Soviet media (Golubovsky, 1991).

Many hopes were placed on Williams’s grass rotation system to solve the problems of the livestock sector. This was another speculative biological concept officially adopted in the USSR. From the 1930s, academician V. R. Williams was the leading supporter of a grass rotation system in Soviet agriculture. The system was based on the idea that the permanent rotation of crops on a given plot would restore soil quality. The main emphasis in the system was the sowing of perennial grass. A

special network of MTSs was established to implement the grass rotation system throughout the USSR. This concept of grass rotation was not new, as most Western countries had already used a similar practice in the nineteenth century. However, Williams's concept was dogmatic and placed too much hope for improvements in the soil structure in grass rotation. For example, Williams announced that the climatic conditions in Russia did not rule out grain yields of as much as 100 centners per hectare if the soil structure could be radically improved by his grass rotation system. He also gave theoretical reasons opposing the planting of winter wheat (Alexandrov, 1982).

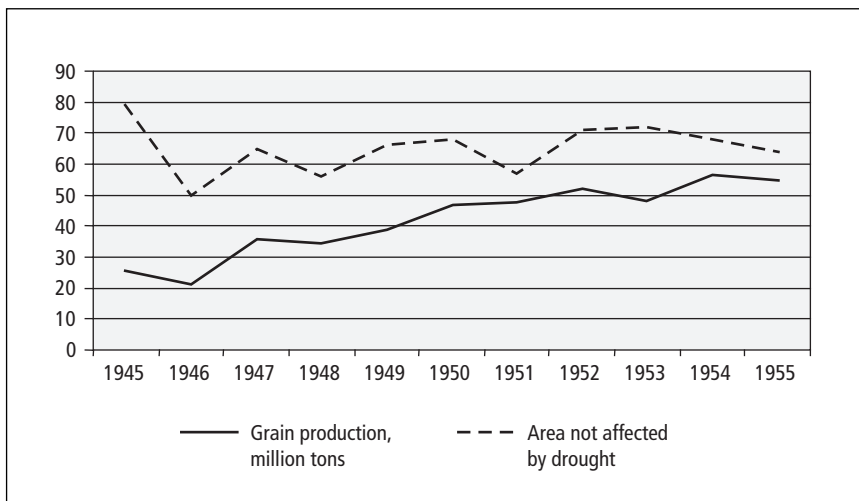
6.2. Weather variations and agricultural production

The Soviet Union was favored by an exceptionally long drought-free period between 1939 and 1945. There were only localized weather problems, for example in 1942 and 1945, when frost killed the winter wheat crop in the Volga regions (*Sel'skoe khozyastvo Povolzhya*, 1957). The 1943 growing season was relatively unfavorable: in central Russia there was too much rain, while in the south and east it was too hot and dry (Harrison, 1994). No information about weather problems is available for 1944, while 1945 experienced excellent weather conditions. Certainly any large drought during World War II would have had disastrous consequences for the country. This was confirmed during the first year of peace, 1946, when a drought occurred and famine followed (Wheatcroft and Davies, 1994).

Unfortunately, there is also a lack of agricultural statistics at regional level for the period of the restoration of the Soviet economy. No detailed analysis of the impact of weather conditions on crops can be made for the period. In general, the weather conditions of the restoration period (1946–1954) appear rather unfavorable. Soviet meteorological experts include 1946, 1948, 1950, 1951, and 1954 in their list of dry years (Rudenko, 1958). Thus, every second year of the post-war decade was poor in terms of weather. According to another Soviet report, the weather between 1946 and 1950 was the worst for the whole post-war period due to large droughts in 1946 and 1948 (*Agroclimatichesky prognoz...*, 1978). The weather did little to help in the restoration of Soviet agriculture.

In this decade, technical factors were of greater significance than weather conditions for the performance of Soviet agriculture. The

Figure 6.2. Grain production and scale of drought in the RSFSR, 1945–1965

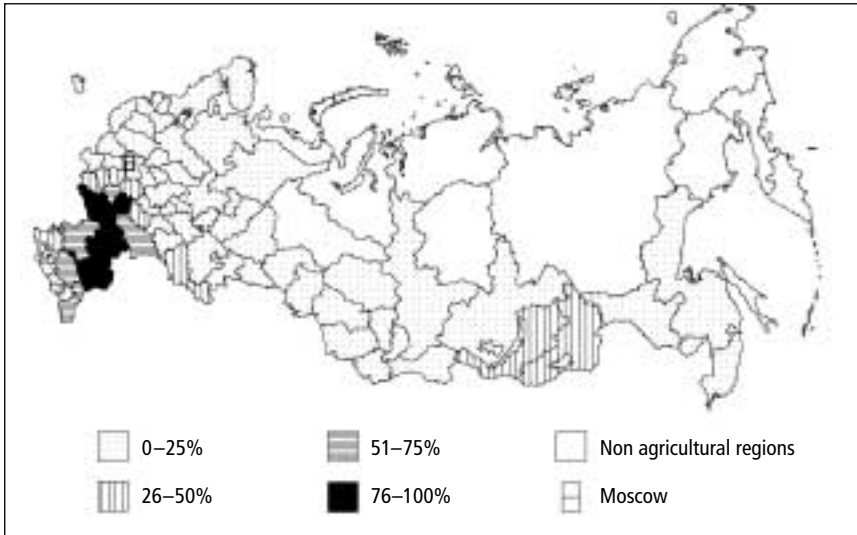


Source: for grain production *Sel'skoe khyaztvo v Rossii*, 2000.

steady restoration of the sowing area and improvements in agricultural techniques from year to year produced visible gains in grain production. The basic level of agricultural production was so low (less than 50 percent of the pre-war level for grain) that even modest progress appeared to be strong upward growth. It is characteristic for the whole restoration period (1946–1954) that gross grain production corresponded little to weather conditions, as shown in Figure 6.2. In this graph the weather conditions are indicated by the proportion of the sown area in the main agricultural zone not affected by drought on the basis of the Hydrothermal Coefficient (HTC) of Seljaninov. The graph shows that in drought years (1946, 1948, 1951) the size of the harvests was quite different. In general, statistical data on grain harvests look much better than one might expect from the descriptions of weather conditions found in Soviet sources for the period.

The worst year of the post-war decade was 1946 when a large-scale drought occurred in the USSR. The drought affected a vast area south of Moscow (Figure 6.3.). It covered the Central Black Earth region, the Volga basin, the basin of the river Don, and eastern and central parts of the Ukraine (Buchinsky, 1974). In total, more than 50 percent of the sown area of the USSR was affected by the drought (Protserov, 1950). It affected 16 provinces of European Russia and was accompanied by

Figure 6.3. Area affected by drought in 1946



strong *sukhoveii*. The harvest of 1946 was the lowest of the decade in the Russian Federation (Figure 6.2.).

The drought of 1946 is described in many Soviet works, but assessments of the scale of the drought differ. Some Soviet experts believe that it was caused by an extraordinary meteorological phenomenon, comparable with the disastrous droughts of 1891 and 1921 (Zavarina, 1954). Protserov, for example, calls the scale of the drought colossal (1950). However, other Soviet experts point out that it was the tragic condition of post-war Soviet farming, not just the weather, that caused the serious effects of the drought (Popov, 1950). One Soviet report stated that the drought was definitely not the largest in the history of Russia and that of 1891 had been far worse (Rudenko, 1958). Moreover, this report denied the very existence of famine in 1946.

It is likely that the drought of 1946 was not the largest, but it was aggravated by the poor state of Soviet agriculture in the post-war decade (when even ploughing was a manual rather than a mechanical process). It is true that the summer of 1946 was one of the driest for many decades. In the whole period from sowing to the appearance of the ears of grain, only 16 millimeters of rain fell in the Ukraine. As a result of the exceptionally dry May (60 percent of the norm for precipitation) and an extremely hot June (4 degrees above average), the grain harvest fell 37

percent below average (*Agroclimatichesky prognoz...*, 1978). In Kursk province (Central Black Earth region), precipitation was reported to be as low as 10 millimeters, and in the Low Volga (Saratov) less than 9 millimeters (Zavarina, 1954).

However, the whole situation in terms of crop growth was probably not catastrophic. For winter crops (that occupied a large area in the affected regions) a reserve of soil moisture was no less important than summer precipitation. One study shows that in the Ukraine, summer precipitation usually supplied only 25 to 30 percent of the moisture while the rest came from the soil moisture that arose from autumn and winter rains. In the forest steppe zone, for example, spring barley transpires 130 to 140 millimeters of water during the vegetation period and only 55 millimeters of that is received through precipitation (Popov, 1950). Fortunately, the autumn of 1945 was quite rainy in most regions of European Russia. The soil was capable of supplying plants with 180 to 200 millimeters of “effective moisture”. For spring crops, the most important reserve of moisture is in the top levels of soil, while for winter crops moisture in the deeper layers is also accessible. Thus the winter crops could yield a reasonable harvest in dry summers if the moisture reserves in the soil were sufficient.

There were also some peculiarities within the synoptic situation in 1946, giving different weather conditions. It was reported that heavy rains occurred in some of the affected areas. For example, in one area of Kirovograd (south of Ukraine), and some districts in the south Urals, good harvests were obtained due to these rains. The drought was often interrupted by cyclones in many regions of European Russia. It is also important to note that the drought of 1946 did not touch Western Siberia and Kazakhstan. On the contrary, unusually rainy weather was observed in Siberia (Rudenko, 1958).

In 1947, a drought was reported in the eastern and southern parts of the Ukraine, but in other regions good weather prevailed. This good weather helped to overcome the difficulties caused by the drought of 1946, and the harvest was actually higher than would be expected from the trend (Figure 6.2.). In the following year, 1948, dry weather was observed throughout the whole summer in the Volga basin, where it strongly affected the crop (Zavarina, 1954). According to one report (*Agroclimatichesky prognoz...*, 1978) the situation in the Volga basin was even worse than in 1946. The report states that in May only 59 percent of normal precipitation was recorded. More importantly, there were

unusually high temperatures, reaching 3.6 degrees above average in May and 3.0 degrees above average in June. There was a 36 percent fall in grain production in the Volga region (in 1946 the figure had been 28 percent). In the Ukraine no rain fell for more than 115 days in some areas. The dry weather also affected the North Caucasus that year. As a result, the gross grain production of the USSR in 1948 was lower than in 1947, despite an increase in the sown area.

In 1949, there were reports of dry winds in a number of regions. In some southern areas of the USSR, spring *sukhoveii* killed 70 to 75 percent of the winter and spring crops. In some places the crops were destroyed completely (Zavarina, 1954). Other regions obtained relatively good harvests and the overall grain production was high.

In 1950, dry weather affected eastern parts of the Central Black Earth region, the Low Volga, the Middle and Lower Don, eastern and central Ukraine, and the Northern Caucasus. The center of this weather was the Middle and Low Volga. In the following year, 1951, drought was again concentrated in the Low Volga. In that year drought and *sukhoveii* were observed in Western Siberia and the North Caucasus. However, Soviet reports ensured that the dry weather that year did not have a serious effect on the economy of the country (ibid.).

The next poor year was 1953. At that year, in southern provinces of Ukraine, precipitation was only 2-6 percent of the norm (Buchinsky, 1974). Drought was also reported in the Low Volga (Volgograd province). In these two important regions the dry weather lasted the whole summer and autumn. In the Low Volga the dry weather continued to damage the young winter growth over 30 percent of the area in the autumn of 1953.

6.3. Food problems

Food problems were certainly acute in the USSR during the whole post-war decade. The average level of food consumption among the Soviet people was still very low. The first two or three years were, perhaps, the worst in terms of food supply, as grain production was considerably lower than the basic demand (see Figure 6.1.). Even with an average harvest, the Soviet people could not count on sufficient bread supplies. Indeed, they found these years even worse than wartime, because many resources were diverted for the construction of the Eastern European Soviet bloc. At that time there were stories circulating that prisoners (whose rations were strictly determined by calorific intake) from many

camps were actually sending food parcels to their starving families on the collectives (Grankshaw, 1959). From 1951 some improvements in the supply of goods and food were seen. However, in 1953, the year of Stalin's death, official statistics, although still unpublished, revealed that Soviet citizens were consuming less meat and fewer dairy products than in 1913 and 1928 (Kiselev and Shagin, 1996). Unfortunately, there is a general lack of information about the food situation for most of the period, with the single exception of the food crisis of 1946.

Most works on the history of the Soviet Union note that the mass famine of 1946, caused by a large-scale drought, was the last in its history. The drought affected the Ukraine, the Central Black Earth region, the Volga basin, the basin of the river Don, and eastern and central parts of the Ukraine. It was reported that more than 50 percent of the sown area of the USSR was affected. However, as has been shown above, the weather conditions were perhaps not catastrophic, while it was the general destruction of Soviet agriculture that was the major cause of the crop failure in 1946. Our estimation of the basic grain balance shows that the country collected 40 percent less than the required seed, food, and feed grain (see Table 6.3.). In Stalin's Russia, this great deficit had to be covered exclusively at the expense of peasants' consumption. Thus mass famine became inevitable in 1946 (and the risk of mass famine was high for any of the first five years).

The crisis of 1946 is still referred to in Russian works as the "unknown famine". No agricultural statistics for regions of the USSR exist for that time. For many years the Soviet Union refused to acknowledge the very fact of mass deaths from famine in 1946. For example, a report reviewing major droughts in the USSR states that the drought of 1946 illustrated the advantages of the Soviet system, as the Soviet peasantry found it relatively easy to overcome the drought and managed not only to sow the winter crop completely but also to obtain a good harvest in 1947, sufficient to meet the total grain demand of the country (Rudenko, 1958). This is untrue. A few official KGB documents were recently published in Russia confirming that the famine of 1946 was severe and occurred in at least four regions of the USSR—Moldova, the Ukraine, the Central Black Earth region and the Low Volga (Kiselev and Shagin, 1996).

According to these documents the severe food crisis had already emerged by the late autumn of 1946 in Moldova, western provinces of the Ukraine, Voronezh (Central Black Earth region), and Volgograd (Low

Volga) provinces. The documents reveal that during November and December the KGB confiscated 4,616 private letters from Voronez and 3,275 letters from Volgograd (then Stalingrad) in which peasants complained about a lack of food. Another document mentions some cases of kolkhozniks having swollen bodies because of malnutrition. Further documents reveal a more dramatic situation in Moldova at the beginning of December. In southern districts of Moldova 10,800 cases of famine-related diseases were reported. More than 55 percent of those affected were children. The number of people suffering from dysentery rapidly increased. As in the 1930s, corpses began to be found in the streets of villages and cities. The KGB were worried about numerous rumors of peasants wanting to cross the border into Romania (where they could find help from their relatives). The local KGB branches were ordered to prevent any such attempts (*ibid.*). All these reports are dated early December 1946, and it is easy to imagine that even worse conditions must have prevailed in the winter and spring of 1947. In his memoirs, Nikita Khrushchev acknowledges that he knew about the mass famine and cases of cannibalism in the Ukraine in the winter of 1947.

A work by V. F. Zima, *Famine in the USSR in 1946 and 1947: its origins and consequences*, was published in Russia in 1996. It investigates the famine of 1946 in great detail. Although our estimate of the country's grain balance indicates that the situation was critical, Zima's main thesis is that the famine could have been avoided if the state policy had been more humanitarian. The author stresses that the authorities deliberately exaggerated the scale of the drought in order to explain food problems in the country at that time. The harvest of 1946 was indeed very poor, but not catastrophic. Poor harvests had occurred before but had not been catastrophic—for example, in 1945 the harvest was also poor but no famine was reported.

The Soviet authorities in fact provoked the famine by excessive grain procurement in regions that had had relatively good harvests—Siberia, the Middle Volga, and Kazakhstan. Thus not only the regions affected by the drought, but other grain-producing regions, suffered that year. According to Zima many kolkhozes were obliged to deliver as much as 70 to 80 percent of their harvest. The average figure for the country was 52 percent. The number of heads of kolkhozes and sovkhoses who were removed on the charge of “sabotaging grain provision” reached 8,000 during the second half of 1946, and about 7,000 the following year (the total number of kolkhozes was 250,000). The criminal law of

7 August 1932 (“On the safeguarding of state property”) was again widely used in cases where peasants had gathered any amount of grain or potatoes from the fields for their own consumption.

The food situation was critical in the winter of 1947. The total USSR grain harvest can roughly be estimated at 34 to 36 million tons in 1946 (about 40 percent of the 1940 harvest, as shown in Table 6.2 for the Russian Federation). Although the state provision campaign was fully carried out, the total amount of grain delivered to the state was only 17.5 million tons, 2.5 million tons less than in 1945 and roughly 50 percent less than in 1940. The state reserve contained 10 million tons in February 1947 (more than in February 1946). The state provided 5.7 million tons for rations to supply industrial workers, party bureaucrats, and the army. About 1 million tons of grain were transported to Eastern Europe for the new allies of the Soviet Union. It was also estimated that about 1 million tons were lost because of poor storage facilities. Thus we can calculate that only 16 million tons were available for the peasants’ consumption, or less than 135 kilograms per capita. According to the Soviet norm a region faced the threat of mass famine if grain production per capita was less than 165 kilograms. According to V. F. Zima (1996), the Soviet Union had sufficient grain reserves to avoid the large-scale famine. If the authorities had allocated 10 million tons from its grain reserve for the starving population, then about 210 kilograms per capita (the norm for consumption) would have been available for consumption and large-scale famine would have been avoided. Instead, the situation developed according to the worst scenario. Food aid from the state was negligible and came too late—in July 1947.

In 1946, the food rationing that had started at the beginning of the war in 1941 was still in operation but did little to help Soviet peasants survive in the devastated regions. Rationing covered the bulk of the non-farm population, but this was far from everybody¹.

Reliable statistics on Soviet mortality are lacking for 1946–1947. Zima (1996) estimates that the total number of people who died from the famine reached 1 million. He also gives a figure of about 4 million for people who suffered famine-related diseases (dysentery, pneumonia, etc.), half a million of whom died between 1946 and 1948. Thus the total number of victims of the mass famine could be as high as one and a half million people. This suggestion seems to be supported by demographic statistics for the whole country. The Soviet population at the beginning of 1946 was 170.5 million, but by the beginning of 1951 the

figure had fallen to 161.3 million, that is, by 5.3 percent. Between 1949 and 1954, the population of the USSR fell by 4 percent. Thus the rate of decrease of the total population in the years of famine was 1.3 percent (2.2 million people) greater than in the following years. However, such calculations need further study since two other factors could be responsible for this high rate—namely, the large numbers of wounded (in 1946 about half a million military personnel were still recovering in hospital) and the migration of non-Russian nationals, mainly Germans and Poles, from the USSR. However, if Zima's estimate is correct, the famine of 1946 was on a similar scale to the major famines of 1920–1921 and 1932–1933.

6.4. Summary

The famine of 1946–1947 was the last in the history of Russia. Major contributing factors differed little from those of the 1930s and 1920s. All these famines started in years of widespread drought, although another important factor was the deep decline in agricultural technology that made crops very vulnerable to any weather vagaries. No replanting of damaged winter crops was conducted. Starving peasants had no access to free agricultural markets in the country due to special political measures (for example, in 1946 and 1947, the authorities obliged the population to buy state bonds for the “reconstruction and restoration of the economy”, thus leaving peasants without cash). The state grain procurement was imposed regardless of the real size of the harvest. The Soviet authorities refused to regard any crop failure as their own political failure, transferring the burden of responsibility exclusively onto the farmers while failure in terms of grain procurement was regarded as the political responsibility of local authorities. There was deep distrust of peasants' complaints and appeals from the local authorities to revise the plan figures. No food aid on a sufficient scale was provided in time. In the most critical time of mass famine, late spring, the authorities provided only seed advances, as they were worried that summer crop areas would remain unsown by peasants. The crucial factor was the forcible prevention of peasant migration from the starving provinces in order to restrict the spread of information about the famine. The combination of these political actions led to any large drought being catastrophic for millions of Russian peasants.

NOTES

- 1 According to official figures, in the war no more than 48 percent of the population on Soviet territory was supported by bread rationing. The remainder had to rely on unofficial or “local” resources. One further feature of the Soviet rationing system was the complicated system of differentiation between various categories of consumers, reflecting the current economic priorities (manual workers, white-collar employees, dependents, and children under 13 years of age). There was a large degree of differentiation: the most privileged obtained five or six times as many calories and grams of protein as the least privileged. In fact, for almost all categories official rations fell far below the minimum necessary to avoid serious malnutrition. For example, according to the war norm, manual workers employed in the defense industry received quite sufficient amounts of food—between 3,181 and 3,460 kcal, while the next category of consumers, represented by ordinary manual workers, received only 1,503 to 1,913 kcal, which was already below the physiological minimum (2,000 kcal) (Harrison, 1994). In Moscow, the majority of the population received between 300 and 600 grams of bread (or 1,300 kcal) and the same amount of potatoes per day. In rural areas bread consumption was reported to reach 225 grams per capita per day.

CHAPTER 7

The virgin lands campaign (1955–1964)

This period covers Nikita Khrushchev's reforms after he became general secretary of the Communist Party after Stalin's death in 1953. The new Soviet leader had very enthusiastic ideas for modernizing the country. He replaced the strongly centralized ministerial structure of the Soviet Union with 89 regional organs called *sovnarkhozes* (Councils of the People's Economy). He permitted the Soviet press to criticize the past, and freed political prisoners. Although he still emphasized the priority of heavy industry he paid more attention to the development of light industry and agriculture. Progress was made in terms of wages and standards of living. Some steps were taken to revive public life in the country, and many public organizations appeared. Unfortunately, none of his projects were completed as designed, while his style of ruling frequently resembled that of the recent past. His failure in the agricultural sector was one of the most obvious and cost him his political career.

7.1. Major developments in agriculture

The first year after Stalin's death, 1954, was marked by a sharp turn in the post-war development of Soviet agriculture. Although the country produced a relatively good harvest, heated discussions on the state of Soviet agriculture were taking place inside the party. Behind the discussion was considerable political infighting in the CPSU among the successors of Stalin. At the XIXth congress of the CPSU (in October 1952) the chairman of the Council of Ministers, G. M. Malenkov, a major contender in the fight to succeed Stalin, announced that the grain problem had been solved in the USSR. Nikita Khrushchev, the chief architect of Soviet agricultural policy from 1950 and First secretary of the party from 1953, opposed Malenkov's statement in his speech on 22 January 1954. For the first time, a top party official openly revealed that

the optimistic view of Soviet agriculture was based on distorted agricultural statistics. According to Khrushchev, grain production in 1952 was only 92 million tons instead of the officially announced 130 million tons. The latter figure was based on estimates of the so-called biological yield rather than the actual amount. According to Khrushchev there was no evidence that Soviet agriculture was performing better than in the pre-war period. He pointed out that in 1940 the state had procured 35.6 million tons of grain while in 1953 the figure was only 29.8 million tons (Khrushchev, 1962).

Khrushchev believed that this desperate shortage of grain could not be alleviated immediately by more intensive or extensive production in the traditional grain areas of Russia (as was evidently argued by his opponents within the party elite). Since the purchase of sufficient foreign grain was, at that time, out of the question, any additional grain for human and livestock consumption could only come from exploiting new lands. Thus the grandiose idea was born to plough up more than 40 million hectares (over 98 million acres) of the virgin steppe in Kazakhstan and Western Siberia, as well as land elsewhere that had long been fallow. This plan was to be largely carried out between 1954 and 1957. In 1954–1955 alone the area under cereals was to increase by 13 million hectares. It was believed that this would increase grain production to 115 million tons in 1955.

On 2 March 1954 a decree “On further increasing grain production in the country and the reclamation of virgin land and wasteland” was adopted by the Central Committee of the CPSU. The decree disclosed once again that the problem of grain production still existed. The total area under crops increased in 1953, as compared with 1940, by 6.8 million hectares, but the area under grain decreased by 3.8 million hectares, or by 3.5 percent. For the same period the Soviet population increased by some 15 million (from 195 million to 210 million). According to the document, it was hard to imagine that the target of the fifth five-year plan (1951–1955) of 164 to 180 million tons of grain would be met by the existing schemes, as since 1950 yields had crept up erratically from a base figure that was well short of the target.

Expectations of the “virgin lands” project were high. The grain received from the newly cultivated lands would go towards building up the state reserve. Nikita Khrushchev also declared that “we should be able to give greater assistance to friendly countries, which are unable to produce enough grain from their own land”. Later he declared that large

reserves of grain were necessary “for expanding trade in grain with other countries”. In 1954 the USSR was able to export only 3.1 million tons of cereal instead of the 4.8 million tons planned (Kiselev and Shagin, 1996). There were also Khrushchev’s expectations of being able to extend the land area under industrial crops (e.g. flax) in European Russia as a result of increased grain acreage in the virgin lands. Although it had never been declared, that the state counted on receiving profits due to still existing price scissors (Bush, 1974).

There was also an important social component in the virgin land program. In his 1954 speech, Khrushchev acknowledged that for years kolkhozes had been required to deliver far more than just the marketable part of their grain harvest to the state. Often the grain procurement plan was higher than a kolkhoz could deliver even in an average year. This resulted in colossal debts in the kolkhozes, by 1 January 1954 reaching about 24 million tons of grain, roughly equaling the size of the annual plan for grain procurement. Khrushchev stated that the practice of excessive grain procurement would be revised if the state received at least an additional 8 to 10 million tons of grain from the new grain sovkhozes on the virgin lands. This would allow the total grain burden on the kolkhozes to be lowered by 3 to 5 million tons (Khrushchev, 1962).

The “virgin land” program was unprecedented in history both in its scale and its rate of implementation. In record time, 42 million hectares of “new land” were to be ploughed up, amounting to about 23 percent of the total sown area of the USSR. In 1954 alone, an army of farmers, mobilized from different regions of the country, ploughed 19 million hectares rather than the planned 13 million hectares. For the first two years of the campaign (1954 and 1955) 31 million hectares were ploughed. The total area of the new arable lands was three times greater than previously planned in 1954 (Vert, 1995).

During these two years, in the Russian Federation alone the area of new cropland reached more than 16 million hectares, including 11 million hectares of virgin land in the steppe zone of Siberia and the Far East, 3.5 million hectares in the Urals region, and 1.7 million hectares in the Volga region (*Narodnoe khozyastvo v 1990, 1991*). By 1958, a total of 25.8 million hectares had already been ploughed in the Russian Federation, of which 7.6 million hectares were planted with cereals and more than 18 million hectares with fodder crops (Table 7.1.).

Kazakhstan was the major reserve of “virgin lands” and the success of the whole campaign depended on the size of harvests in this region.

Table 7.1. Changes in crop area in the Russian Federation, 1950–1965 (millions of hectares)

Parameters	1950	1958	1960	1963	1965
Crop area	88.9	114.7	120.7	130.5	124.0
Cereals	64.9	72.5	71.4	79.4	77.6
Industrial	6.2	5.7	5.9	6.8	7.2
Potato and vegetable	6.0	6.5	6.1	5.7	5.6
Fodder	11.8	30.0	37.3	38.6	33.6
Incl. grass	9.7	19.0	22.8	17.9	18.0
Incl. annual grass	3.7	10.5	12.7	10.8	10.5
Perennial grass	6.0	8.5	10.1	7.0	7.3
Silage (maize)	2.0	10.2	11.9	19.8	15.0
Fallow			12.0		9.9

Source: *Narodnoe Khozyastvo RSFSR v 1965, 1966.*

In two years, 25 million hectares were ploughed there and the total crop area increased 3.5-fold—from 9.7 million to 34.2 million hectares. More than 70 percent of the new cropland was sown with valuable varieties of spring wheat. In the following years the area of cropland in Kazakhstan changed little. The total expenditure for the cultivation of the virgin lands would have been enormous. About 4 million settlers and seasonal workers, often with their furniture and sometimes with their livestock, were moved into northern Kazakhstan (Bush, 1964).

The virgin land in Kazakhstan “had been little used before, however, for good reasons; it lacked adequate rainfall and a long enough growing season” (Goldman, 1968). There had already been an attempt to plough the virgin lands in the period 1928 to 1933, when some sovkhozes had been organized, but yields had been very low—no higher than three or four centners per hectare. This was followed by a complete fiasco: the failure for a number of years to obtain a crop even equal to the amount of grain sown forced the Soviet authorities to abandon the idea of the further expansion of the crop area there (Kokol, 1962).

The unfavorable climate left little chance of success for the ambitious new program of cultivating the virgin lands of Kazakhstan and Western Siberia. The harvest in the new agricultural zone had proved to be very unpredictable. Table 7.2. gives some indication of the poor performance of the virgin lands program. The planned targets for the fifth (1951–1955) and sixth (1956–1960) five-year plan periods, to achieve a

Table 7.2. The main parameters of grain production in the USSR and Kazakhstan, 1949–1965

Parameters	1949–1953	1954–1959	1960–1965	Khrushchev's expectations
USSR				
Grain production (millions of tons)	80.3	115.4	129.5	164–180
Grain procurement (millions of tons)	32.8	44	50	40–42
Grain remainder (millions of tons)	47.5	71.4	79.5	50.5–52.5
Average yield (centners per ha)	7.7	9.4	10.3	15
Kazakhstan				
Grain production (millions of tons)	3.9	14.7	15.2	20
Grain procurement (millions of tons)	1.8	8.8	8.1	12–13
Average yield (centners per ha)	6.2	7.6	6.5	10

Source: Bush, 1964.

total grain production of 164 to 180 million tons, were not met (even in the best year, 1964), nor were Khrushchev's expectations for Kazakhstan to produce no less than 20 million tons of grain annually. The expectation of a minimum average yield of 10 centners per hectare from the virgin lands for 1956 was not realized either. Moreover, in his 1954 speech the Soviet leader said that he also hoped to obtain as much as 14 to 15 centners per hectare, an amount that, he alleged, had been produced by some of the best sovkhoses in these areas in the early 1950s. After a disastrous year (1963) the Soviet leader lowered his expectations for cereal yields from the virgin lands to 8 centners per hectare. The average yield for the USSR was expected to be 15 centners per hectare. This yield would allow the United States' level of grain production to be reached (Kisilev and Shagin, 1996). As these data show, the main problem was still low yields.

If some improved results were achieved, it was more likely to have been due to more land being ploughed than had been planned before

the start of the campaign. Table 7.2. shows that the amount of grain available both to the state and to collective farmers increased. Khrushchev expected that a few years after the start of the program deliveries to the state would rise to between 40 and 42 million tons, but the real figures were even higher. The amount of grain left in kolkhozes and sovkhozes had increased by 50 percent by the late 1950s. It is also likely that Soviet kolkhozes and sovkhozes had no shortage of food grain in an average year, as had happened before.

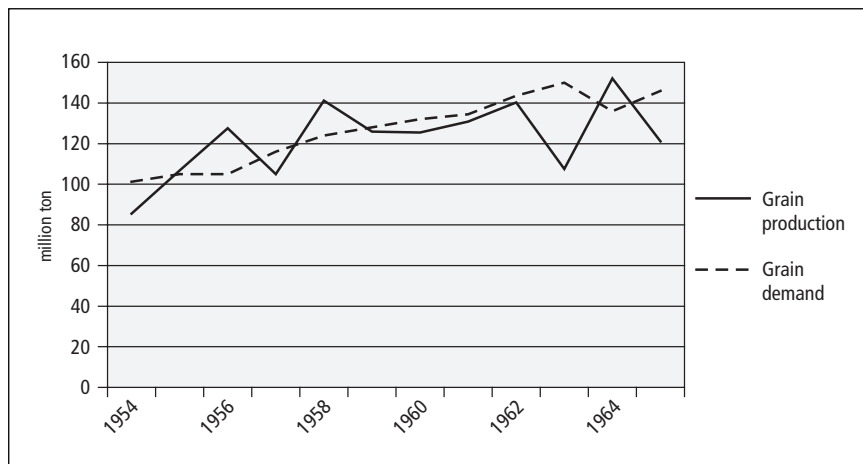
Despite the radical growth in area under cereals there was an increasing grain imbalance in the USSR. Khrushchev presented the following figures for grain demand for the USSR in 1955. His estimate for the country's demand for animal feed grain was 50.24 million tons (about 6 centners per standard animal unit per annum) or 45 percent of the total production. The demand for food grain was estimated at 40 million tons (0.2 tons per capita per annum) or 33 percent of the total production. The seed demand was estimated by the Soviet leader to be 11.2 million tons (1.5 centners per hectare of sown area) (Popluiko, 1964). Using these figures it is possible to calculate the basic grain demand for the remaining years of the decade (Figure 7.1.).

A comparison of the figures for grain production and demand shows that the demand continually outstripped production between 1954 and 1965. The grain demand increased by 57 percent from 1955–1957 to 1958–1961, and by 5 percent over the next four years. Grain production increased by only 16 percent in the same period and then even decreased in the next four years. The grain shortage would have been exacerbated from 1960, when grain demand (not even taking into account the needs for exports, the state reserve, and the industrial sector) was higher than grain production.

The best year was 1956, when a record harvest (the input from the virgin lands was then 50 percent) perhaps played a decisive role in the recognition of Khrushchev as political leader at the XXth Congress of the CPSU (Vert, 1995). The worst year was 1963, when the grain deficit reached about 40 million tons. In that year, for the first time in its history, the USSR had to import a large amount of grain from the West. Some experts believe that these 10.4 million tons of grain ordered from Western suppliers were a major factor in Khrushchev's downfall in October 1964 (Bush, 1974).

The main reason for the grain imbalance was the rapid growth in demand for animal feed grain (Table 7.3.). In contrast, the demand for

Figure 7.1. Estimated grain balance of the USSR, 1954–1965



food grain and seed changed little during the decade. The animal feed grain demand grew by 45 percent and reached 65 percent of the total grain production between 1961 and 1965. This proportion was evidently too high for Russian climatic conditions, where stable and predictable yields are not possible but where there are great fluctuations in the size of grain harvests from year to year. Any downturn in grain production would bring about a serious shortage in the feed grain reserve for Soviet livestock. In launching the livestock development program, the Soviet leader was evidently relying on his own expectations of harvests from the virgin lands. What actually happened was that harvests were far below these expectations, thus a shortage of feed grain emerged in the USSR.

The push for an increase in the livestock inventory began in May 1957, when Khrushchev surprised the world by setting the target of “catching up with America” in meat and milk production per capita within a record short period. It seems that the good harvest of 1956 gave the Soviet leader the impression that the grain problem had already been solved or that it would be solved in the near future. Similarly, in 1949, when the Soviet authorities launched the three-year livestock program, they first announced that the grain problem had already been solved (Karasev, 1951).

To “catch up with the Americans” the USSR needed to increase meat and dairy production two- or three-fold for three years.

Table 7.3. Grain production and estimated basic grain requirements in the USSR (millions of tons)

Indicators	Grain production	Total grain demand	Incl. seed	Food grain	Feed grain
1954	85.6	101.2	11	40	50
1955	106.8	105	11	40	54
1956	127.6	105	11	40	54
1957	105	116	11	40	65
1958	141.2	124	12	41	71
1959	125.9	128	12	41	75
1960	125.5	132	12	42	78
1961	130.8	134.5	12.5	42	80
1962	140.2	143.5	12.5	43	88
1963	107.5	150	13	44	93
1964	152.1	136	13	45	78
1965	121.1	146	13	45	88

Source: calculated on the basis of statistical reports for various years: *Narodnoe Khozyastvo SSSR v 1959, 1960*; *Narodnoe Khozyastvo SSSR v 1960, 1961*; *Narodnoe Khozyastvo SSSR v 1961, 1962*; *Narodnoe Khozyastvo SSSR v 1970, 1971*.

Everywhere in the USSR notices appeared calling for increases in the production of eggs by 254 percent, of meat by 200 percent, and of milk by 195 percent by 1960. This was a large gamble as there was not enough animal feedstuff in the USSR for such a move. The first year and a half brought only an 8 percent increase in meat production in the USSR (Vert, 1995). The deadline for the plan targets was soon shifted from 1959 to 1965. The seven-year plan adopted in 1959 called for a doubling of meat output by 1965, to 16 million tons. In 1959, only 8.9 million tons of meat were produced, with 8.7 million tons in 1960, and 8.75 million tons in 1961. In 1952, collective farms produced 62.5 million tons of milk, 61.7 million tons in 1960, and 61.7 million tons again in 1961, while the planned target for 1965 was as high as 100 to 105 million tons. In fact, the Soviet Union produced 10 million tons of meat and 72.6 million tons of milk in 1965 (the targets were not being met even 15 years later) (see *Narodnoe khozyastvo SSSR in 1922–82, 1982*). The performance of the meat and milk production sector of the largest Soviet republic, the Russian Federation, was also disappointing, as real

Table 7.4. Meat and milk production in the Russian Federation, 1957–1965 (millions of tons)

Indicators	Meat	Milk
1957	3.8	31.1
1958	3.9	33
1959	4.6	34.6
1960	4.5	34.5
1961	4.5	34.7
1962	4.9	35.8
1963	5.5	34.6
1964	4.2	35.7
1965	5.2	40.1

Source: *Selskoe khozyastvo v Rossii*, 2000.

figures for growth between 1959 and 1965 were only 13 and 21.5 percent respectively (Table 7.4.).

From the very beginning the meat campaign was conducted exclusively by administrative methods and was accompanied by numerous problems. Sometimes, the administrative pressure produced such phenomena as the “Ryazan affair”. Disappointed by low growth in meat production in the first year of the campaign, by the end of 1958 Khrushchev put heavy pressure on local party officials, demanding that they adopt “decisive” measures to increase meat production. One party leader in Ryazan oblast, A. Larionov, publicly promised to increase the province’s meat production threefold in 1959. His words were reported on the front pages of Soviet papers and Larionov was immediately awarded a high Soviet honor. To fulfill his promises, in 1959 Larionov ordered the slaughter of all young animals and a considerable proportion of the dairy herd, and he expropriated private herds. However, this was not sufficient and he had to purchase cattle from other provinces. As a result, meat disappeared from the local shops but the Ryazan oblast had delivered to the state 150,000 tons of meat by the end of 1959, three times more than in 1958. Larionov then announced that he would deliver 180,000 tons the next year, but the actual figure was as low as 30,000 tons because the size of the livestock herd had been reduced by 65 percent in 1959 (Vert, 1995). At the end of 1960, Larionov committed suicide.

This case was, of course, extraordinary, even for the Soviet Union, but to some extent similar methods were used by local authorities in

other regions between 1959 and 1962. According to Khrushchev himself, speaking at the January 1961 Plenum of the Central Committee, various kinds of pretence and exaggerated reporting took place—for example, in a number of cases butter was purchased from the shops and re-delivered to the state as new produce. Many experts believe (through a sample survey) that the statistics on meat production were distorted because the very large proportion of meat and milk in the private sector was not adequately counted, resulting in unreliable and possibly overstated numbers (Nove, 1969). In a report of the Central Statistical Administration (TsSU) concerning the results of economic development in 1960, it was recognized that some increase in the livestock inventory had been achieved, partly (or, in the opinion of Western experts, exclusively) due to the redistribution of livestock between the private and state sectors (Gamburtsev, 1961).

It is also possible that the growth in meat production in 1958–1959 was achieved at the expense of the reproductive herd. It would be unreasonable to expect a constant rate of growth in the livestock herds subsequently, when increasing numbers of animals were being diverted from the reproductive herd for slaughter in order to increase meat production.

Low productivity in the livestock sector led to excessive slaughtering of livestock. The average weight of a cow ranges between 250 and 500 kilograms, and that of bulls between 500 and 900 kilograms. However, in 1959 the average weight of an animal on arrival at the abattoir was only 248 kilograms. As the dead weight of a carcass is only 45 percent of the live weight, it is possible to calculate that in order to obtain 3.226 tons of beef, at least 2.7 million head of livestock needed to be slaughtered in 1959 (Gamburtsev, 1961). It is worth noting that the average live weight for cattle on the eve of the collectivization period was 376 kilograms, and in the pre-war period 238 kilograms. It seems that in order to increase the meat deliveries to the state, a lot of the animals that the *sovkhozes* and *kolkhozes* were bringing to the slaughterhouses were in poor condition.

The demand that every *kolkhoz* and *sovkhoz* increase the size of its herd annually resulted in a lowering of animal productivity, as they were afraid to get rid of low-quality animals from the herds. Because these were retained, overall productivity went down. Soviet milk production per cow had declined steadily since 1959, as a result of the tendency to keep the head count high rather than keeping fewer milk cows and feeding them well to achieve a high milk output per animal, and thus in

Table 7.5. Livestock numbers in the USSR and USA*

Parameter	Soviet Union	United States
Number of cattle (millions)	82.1	99.5
Cows (millions)	36.3	19.2
Sheep and goats (millions)	144.4	31.4
Pigs (millions)	66.6	56.9
Convenient units (millions)	179.8	146.3
Meat production (millions of tons)	8.7	13.0
Meat production (kg per capita)	42	100

* Data on the livestock inventory relate to January 1962. Data on meat production are given for 1960. The number of convenient units (or heads) is calculated on the basis that one pig equals 0.6 head of cattle and one sheep or goat equals 0.4 head of cattle.

Source: Popluiko, 1962.

total. Managers had long tended to keep more cows than sound husbandry would recommend, and also to keep old cows beyond their most productive age—all for the sake of statistics rather than solid economic achievement. The proportion of low-quality cows reached 30 percent (Chugunov, 1964).

Despite all efforts, the rate of growth in livestock herds steadily dropped from the beginning of the campaign in 1957. For example, cattle herds were growing at a rate of 9 percent per annum in 1958, but the rate was down to 5 percent in 1960 and 2 percent in 1961. Cows were down from 8 percent to 2 percent, and sheep from 11 percent to 5 percent (*Vestnik statistiki*, 1960). Meat and milk production in 1960 and 1961 were lower than in 1959. Thus the official statistics reveal that livestock breeding had actually gone into a recession in the period 1959 to 1961. The situation was so serious that it began to be spoken about openly in the Soviet press, and at least two regional Communist Party first secretaries were fired because of failure to fulfill livestock plans (Krasnodarsky krai and Semipalatinsk oblast) (Gamburtsev, 1961).

Five years had passed since the Soviet leader announced the target of “catching up with America” in relation to meat production, but results were disappointing, especially when compared with Western countries. Table 7.5. gives a comparison of livestock productivity in the USSR and the United States for 1 January 1962. The statistics show a striking difference in the productivity of the livestock sectors in the two countries.

The principal reason for this failure was that Stalin's model of the kolkhoz system still existed during the Khrushchev era. Although in 1958 the system of economic and political control over the kolkhozes by the MTS s had been dismantled, there was no significant change in the relationship between the collective farms and the state. The distorted price relationship established by the state was a major obstacle to the development of Soviet agriculture. The output of most crops and animal products in the public sector was achieved either at a loss or at very low rates of profitability. Thus the more a farm sold to the state, the more losses it incurred. This was especially true for meat production. It was more profitable (or less unprofitable) for farms to sell grain and potatoes than feed it to their livestock. To produce 1 kilogram live weight of pork (worth 7 rubles) required 16 kilograms of potatoes, valued at 8.48 rubles. As feed costs are generally 60 percent of the cost of production, the net loss for such operations was prohibitive (*Voprosy ekonomiki*, 1958). Thus 1958 prices did not cover the costs of production: collective farmers were effectively "subsidizing" urban consumers in their meat and dairy food purchases (*Voprosy ekonomiki*, 1958).

To stimulate meat production in kolkhozes and sovkhoses, the Soviet authorities had to raise the purchase prices for meat and dairy products in 1958. However, this increase in price did not solve the problem. Simultaneously, in order to reach the high planned targets, peasants increased the number of cattle while the feeding base remained poor. This led to increases in the cost of meat production. In 1962 the magazine *Ekonomika Sel'skogo Khozyastva* (Economy of agriculture) reported that during the period 1957 to 1960 the cost of meat and dairy production had risen dramatically in many sovkhoses of the Soviet republics. For example, the cost of meat production had increased by 30 percent. According to the magazine, this was caused by a worsening situation regarding feed supplies, causing a slowdown in the growth in the number of cattle. In most regions the growth of forage production was behind that of the numbers of cattle and poultry. Cattle received minimal feed, only enough to keep them more or less alive during the long winter. The productivity of the cattle decreased and the cost of meat and dairy production increased as a result. The magazine noted that if the harvest in a particular year did not produce enough feed, and if mechanization was still at a low level, then sovkhoses and kolkhozes could only produce meat and milk by incurring great losses to themselves. The level of mechanization was still very low because of weak

investment by the state. At the beginning of the 1960s, only 44 percent of pigs and 33 percent of cattle were supplied with water via an automated system, and only 10 percent of cows were milked by electric machines (*Ekonomika Sel'skogo Khozyastva*, 1962).

At the beginning of the 1960s, the gap between production costs and retail price for meat had widened. In 1960, the cost of producing one centner of beef was 91.6 rubles while its retail price was 59.1 rubles. These figures underline the absurdity of Khrushchev's great meat and milk campaign, conducted at a time when all livestock products incurred heavy losses for farms. However, in 1961 Khrushchev still warned kolkhozes that the state was not going to further subsidize meat production. He demanded that kolkhozes should find ways to raise their productivity by themselves and that they use cheaper feed in order to double meat production by 1965.

However, in 1962, after some hesitation, the Soviet government started to reform purchase and retail prices. The new prices, set in a decree dated 1 June 1962, brought average production costs and selling prices more into line. According to the decree, the purchase prices for meat and dairy products were raised by 35 and 20 percent respectively. While before the reform kolkhozes had faced 32 to 33 percent losses because of the low purchase prices, after the reform they were to have 2 to 3 percent profit. It was too little to stimulate the activity of the farms. *Ekonomika Sel'skogo Khozyastva* (1962) had disclosed that a 35 percent increase in the price of meat was still not sufficient to cover the costs of production. One centner of meat (live weight) in the RSFSR, according to the journal, cost 87.1 rubles to produce, whereas the average purchase price was still only 81 rubles. The deficit had to be covered by cutting production costs. The journal claimed that if the harvest of 1962 did not bring sufficient amounts of forage, and if the mechanization of the livestock sector did not move forward, then production costs would not decrease and meat production would still be an unprofitable sector.

The primary reason for the low productivity of the livestock sector was still insufficient animal feed for the planned growth in livestock numbers in the required, short, period. Neither grain nor other fodder harvests reached the levels planned to support Khrushchev's livestock program. It is evident that fodder production, including feed grain, should have grown faster than the size of the herd. When, in 1957, Khrushchev set the target of tripling meat production, targets for a rapid increase in fodder production (by 2.6 to 3 times) was announced as well.

Table 7.6. Fodder consumption in the Russian Federation (millions of tons of feed units)

Fodder	1955	1965	Recommended
Pasture grass	23.4	29	60.8
Coarse:	51.4	35.7	67.2
Inc. Perennial grass	7.5	6.4	—
Annual grass	5.3	8.0	—
Straw	15.6	19.0	—
Hay	22.8	2.3	—
Succulent	8.4	34	54.8
Inc. silage	3.4	14.9	—
Grain	12.5	33.4	66.2
Total	95.7	132.1	249

Source: the recommended figures are calculated on the basis of the report by the Academy of Sciences of the USSR (Pelt, 1959); statistical data are found in the Soviet statistical yearbook *Narodnoe khozyastvo RSFSR v 1971, 1972*.

In 1959, the USSR Academy of Sciences published a report investigating the state of fodder resources in the country in the context of the new party targets for the livestock sector (Pelt, 1959). The report repeated Khrushchev's expectations for the development of fodder resources. According to the report, the productivity of fodder crops should increase by 2.6 times per 100 hectares, the share of succulent fodder should increase by 2.5 times (from 8.8 percent to 22 percent) as compared with 1955, while the proportion of coarse food should decrease by half (from 53.5 percent to 27 percent), although their amount should increase in absolute terms. The report concluded that about 50 percent of the gross grain production should be allocated for the feeding of livestock but it gave no indication of whether actual or planned harvests were used in its calculation. No word was said about the unrealistic character of these estimates (Table 7.6.).

What happened in 1965 was that production in all categories of fodder crops exceeded the 1955 figure by only 1.4 times instead of 2.6 (this planned level of total fodder production had never been achieved in the USSR). Moreover, the amount of feed available per head of livestock in 1965, due to the growth of the livestock inventory, was at the level of 1950 and reached only 70 percent of the norm (Table 7.7.). Compared with 1955, the feed consumption per unit of livestock

Table 7.7. Fodder consumption per head of conventional livestock per annum in the Russian Federation (centners of feed units)¹

Fodder	1950	1955	1965	Norm
Pasture grass	5.6	5.9	4.8	7–8.5
Coarse	10.8	12.9	5.9	12
Inc. perennial grass	–	1.9	1.1	–
Hay	–	5.7	0.4	–
Succulent	1.8	2.1	5.6	7–9
Grain	2.8	3.2	5.5	2.8–4.5
Total	21	24.1	21.8	28–34

Source: norm for fodder consumption *Selskoe khozyastvo Komi ASSR*, 1951; statistical data are found in the Soviet statistical yearbook *Narodnoe khozyastvo RSFSR v 1971*, 1972.

decreased in the 1960s. In 1961, in a speech in Tselinograd (Kazakhstan), Khrushchev acknowledged this fact, saying that the size of Soviet livestock inventories had increased faster than fodder production (*Pravda*, 1961).

The problem was that the productivity of fodder crops remained very low in the USSR. The report of the Academy of Sciences made its calculations for 1965 assuming much higher productivity of all fodder crops than in 1955. It was assumed that the average productivity for feed cereals would be as high as 14 to 16 centners per hectare; that of hay or annual grass 25 centners per hectare; perennial grass 30 centners per hectare; silage 400 centners per hectare; and root crops 350 centners per hectare. Unfortunately, no progress in terms of crop yields could be observed by 1965. Yields of feed cereals (oats and barley) were still 8 to 10 centners per hectare, annual and perennial grasses yielded only 12 to 14 centners per hectare, roots 100 centners per hectare, and silage 116 to 118 centners per hectare.

The most severe challenge came from the very poor state of natural meadows in the USSR. The report assumed that about 30 million hectares of hayfield and pasture would be radically improved and their productivity (hay) would reach 25 to 30 centners per hectare, but official statistics (for the RSFSR) show that the average productivity of hayfields remained very low, at 6 to 8 centners per hectare (*Narodnoe khozyastvo RSFSR v 1971*, 1972). Moreover, the absolute amount of hay obtained from natural grasslands declined on a scale unprecedented

in the history of Russia. Between 1955 and 1965, the total production of hay dropped by 90 percent—from 23.4 to 2.3 million tons of standard feed units.

This was a direct result of the virgin land campaign, when millions of hectares of natural grassland were lost. The term “virgin lands” was certainly misleading. All of the lands that were to be ploughed were not virgin steppe: some were pastures or hayfields. The expansion of the wheat crop area in Kazakhstan and Western Siberia was achieved exclusively at the expense of pasturelands. The report of the Academy of Sciences on feed resources mentioned this problem of the hay shortage and its connection with the ploughing of “virgin lands”. It claimed that in the Altai region (Western Siberia), the growth in arable land had been achieved at the expense of the best hayfields and pastures of the region. During the virgin land campaign, the area of pastureland and hayfields in Siberia decreased by 2 to 3 times. The report also reveals that in Kazakhstan, pastureland and hayfields occupied 80 percent of agricultural land in 1954, but only 46 and 4.8 percent (respectively) by the end of 1955.

A similar problem of the reduction in grassland emerged in the traditional agricultural regions of European Russia. Since there were no “virgin lands” in the latter, the order was to plough land that had long lain fallow. The claim “Fallow land is lost land; erosion is a fiction” became a slogan on the front pages of Soviet papers at that time. Soviet economists calculated how much grain a region was losing if it did not sow its long-term fallow lands. In 1950, the total area of fallow land in the USSR reached 32 million hectares, while in 1961 the figure was half of this, at 16 million hectares (*Mistakes in Exploitation*, 1967). The fallow lands played an important role not only in restoring nutrients to the soil but also for providing grazing in early spring and producing hay for cattle.

Khrushchev placed a great deal of hope in the radical expansion of the corn crop area. This idea was announced for the first time by the Soviet leader at the Plenum of the CPSU Central Committee in January 1955 (this plenum was exclusively devoted to livestock production). In his speech Khrushchev announced the target of increasing the acreage of corn from 3.5 million hectares to as much as 28 million hectares by 1960. He said that “the extension of areas sown under corn in our country is one of the largest reserves for the production of grain. If by 1960 we increase the areas sown under corn from the 3.5 million hectares of

1953 to not less than 28 million hectares, this will enable us to increase considerably the production of grain.” The increased area planted with corn was to come from several sources: (a) about 8.5 million hectares of low-yielding grain crops; (b) about 4 million hectares of various fodder crops, grasses, and root crops; and (c) some 3.0 million hectares of low-production meadows, pastures, and abandoned land. All of these were to be ploughed and sown with corn. These three sources were to supply about 15.5 million hectares of land for corn. Additional land for corn was to be obtained by planting corn in clear or clean fallow land (Johnson, 1955).

Khrushchev presented figures to prove that corn cultivation would be more profitable than any of the above-mentioned crops, as well as meadows and pasture. To prove the low potential of perennial hay he indicated that the grain crops on the Ministry of State farms had a biological yield of 10.2 centners or 1,420 feed units per hectare, while the average yield from perennial hay was only 550 feed units (*Pravda*, 1954). Only sugar beet yielded more feed units per hectare than corn.

The personal dedication of Khrushchev to corn cultivation became a subject for numerous anecdotes in the USSR. It is frequently recalled that the Soviet leader ordered virtually every farm to grow some corn, regardless of climatic conditions that were sometimes unsuitable. However, some experts believe that there were some good reasons for the corn cultivation program. One American expert, D. G. Johnson (1955), provided perhaps the first comprehensive analysis of the program, which is worth describing here.

Johnson first of all stressed that Khrushchev’s program emphasized the production of silage from corn rather than the production of mature ear corn. If Khrushchev had talked about the program in terms of harvesting mature ear corn, the program would certainly have been a failure. However, corn can be grown for silage with reasonable success in areas with too short a growing season for corn to fully ripen. Besides, corn can be harvested for silage under weather conditions that are a serious deterrent to the harvesting of hay. Even if the harvest of corn for silage was delayed beyond the optimum date, there would still be a large yield in terms of fodder even if the grain had not entirely ripened. Also, corn is quite efficient in the utilization of moisture. The corn plant transpires only about two-thirds as much water per pound of dry matter as do wheat, barley, or oats. Only millet and sorghum equal or surpass corn in their ability to produce biomass from a given amount of water (*ibid.*).

Khrushchev was certainly mistaken in his expectations as the figures he used for the corn harvest were too high. The Soviet leader quoted a high yield of corn—27.5 to 30.0 metric tons per hectare. However, in the United States as a whole, yields seldom averaged more than 22 tons. In Iowa, the state with the highest yield of ear corn (between 30 and 40 centners per hectare), the silage yield did not exceed 25 metric tons even in relatively favorable growing seasons. However, in Dakota, an area quite similar to the contemporary grain area in the Ukraine, silage yields were not 27 to 30 metric tons per hectare but only about 10 tons (*ibid.*). The other expectations of the Soviet leader, of increasing corn productivity due to fertilizer application, more labor, or the introduction of hybrid corn, also looked doubtful.

This analysis, carried out by Johnson in 1955, soon proved to be correct as the productivity of corn never reached the level planned by Khrushchev's program. The planned planting area had not been reached and corn productivity had not increased. According to official Soviet statistics, the silage yield was only about 10 to 12 tons per hectare rather than 27.5 to 30 tons per hectare. In total, the production of silage increased 4.4 times, but this increase did not even compensate for the losses in hay production between 1955 and 1965.

There were two stages in the expansion of the corn crop in the country. The first took place between 1955 and 1957 in the course of the virgin land campaign. During 1955–1957 some 18 million hectares were sown with corn. Subsequently, no increase took place in the crop area and in many regions the area of corn even decreased in the following years. From 1958 to 1960 there was only a slight growth in corn crop area, but in 1961–1962 a new wave of the corn program started and, as a result, an additional 8 million hectares were planted in the Russian Federation alone. This expansion of the corn area was again conducted at the expense of grass fodder land and meadows.

The second wave of expansion of the corn crop started in 1962 (probably in reaction to the recession in the livestock sector in 1960–1961). In March 1962 a resolution on the ploughing of grasslands was adopted by the CPSU Central Committee. At that time perennial and annual grass occupied 36 million hectares, about 11 million hectares were planted with oats, and 16 million hectares were fallow. In total these lands occupied 63 million hectares, or 29 percent of the total area of arable land of the USSR. Khrushchev insisted on reducing the area of grass by 8 million hectares, and that of fallow land by 7 million hectares.

Instead, the area under maize, peas, beet, and other cultivated crops was significantly increased. He strongly rejected the grass rotation system. Local authorities tried too vigorously to implement the resolution. As a result, meadows were ploughed, and clover and oat crops were replaced by maize and peas regardless of the local natural features. By 1963, the area of fallow land had decreased from 16 to 6.3 million hectares. In the RSFSR, the area under perennial grass decreased by 25 percent between 1960 and 1965 (*Narodnoe khozyastvo RSFSR v 1965, 1966*).

By the beginning of the 1960s, many Soviet experts were already opposed to the corn campaign, which, for the first time, led to criticism of the virgin land project itself. Even some local authorities (Novgorod, Vologda, Omsk, Perm, Kemerevo) opposed the resolution on the ploughing of grasslands. Many Soviet writers strongly criticized the Soviet leader's idea. They wrote of the uselessness of cultivating maize in the northern forest zone. They also wrote that the ploughing of alluvial plains led to the erosion of the top layer of the soil during spring flooding. In some places farmers had to leave these areas completely. It was stated that the real issue was the poor state of pastures and hayfields, which needed to be improved. In forest and forest steppe zones, 40 million hectares of hayfield and pastureland were overgrown with bushes and trees (Mondich, 1963).

Between 1961 and 1963 there was an explosion of critical articles in the Soviet media concerning the poor state of pastures and hayfields in the country. *Literaturnaya Gazeta* of 8 April published the article "Dispute on (the river) Vyatka" (1961), which spoke out against the ploughing of flood meadows along the river Vyatka, as in pre-revolutionary time livestock breeding had flourished there. *Pravda* (1963) carried an article which severely criticized the state of agriculture in Vologda oblast (Central Russia). For the past three years livestock indices had been at a standstill (for meat), or in some cases had fallen (for dairy products). The big issue was fodder in an area that had always specialized in milk, butter, and meat. The author noted that the rich pastureland was being increasingly overgrown with shrubs, and he placed the blame at the door of the local party leadership. However, it can be seen from his article that the main reason lay in Khrushchev's agricultural reorganization and his struggle against the grassland system. His recipe for growing more corn and beet had not been vindicated in the northern areas. In 1962, Vologda oblast had to purchase from the state about 50,000 tons of concentrated feed. The problem was that beet and corn

were not suitable for the conditions prevailing in such northern regions (*State of agriculture in Vologda oblast*, 1963).

The chairman of Tambov (Central Black Earth region) agricultural *obispolkom* (local executive committee), V. Cherny, in the article “Meadows and pastures are not stepchildren”, published in the central paper *Izvestia* (1964), wrote: “The situation of the meadows and pastures is very alarming. Because of the wasteful attitude towards meadows, especially towards alluvial lands, suitable areas for hay cultivation are decreasing because of swamp formation and overgrowth. These areas are no longer suitable for mechanized harvesting. Only recently the amount of meadow hay gathered has been cut by half. In one kolkhoz only 1.2 centners of hay per hectare are gathered.” The chairman recalled that a geobotanical investigation of the meadows of Tambov province, conducted in 1915 and 1916, showed that in those years the alluvial meadows usually yielded between 30 and 40 centners of hay per hectare.

The shortage of hay resources in central regions resulted in large straw imports from remote southern regions. Agricultural “troubleshooters” from the Moscow oblast spent months in Kuban (North Caucasus) and Volgograd oblasts (Low Volga), where they purchased straw to send to the Moscow oblast farms in order to cover the deficit in their fodder balance. In 1963 alone, the Yegoryevsk administration (a district in Moscow oblast) purchased 190,000 rubles worth of fodder from distant regions. In 1964, the expenditure was expected to be the same. These purchases placed a heavy burden on the farms because the cost of a ton of delivered straw from these southern provinces was 35 to 40 rubles (including transportation), while the cost of a ton of hay in the Moscow region, even in a poor harvest year, was only 15 to 16 rubles. Despite the fact that for every head of horned cattle there was on average up to two hectares of meadowland in the Moscow oblast, very little hay was prepared. According to local farmers: “One needs only to enquire about the condition of the fodder lands and then everything becomes clear. The planted grasses and the ‘improved meadows’ which supply the main bulk of hay are in a state of neglect. More than 30 percent of these ‘improved meadows’ give very little: up to five or six centners per hectare” (United Press International, 1963). Almost all of the farms were planning to plant perennial grasses, but even this project was less than 30 percent completed. Even the improved meadows were not providing much hay because they were not given nitrogen-phosphorus and potash fertilizers (NPK), as a result of which the yields, a mere

three years after the basic improvements began, had again fallen to seven to eight centners per hectare of hay. In addition, expenditures for improving one hectare of meadowland ranged from 90 to 120 rubles. There was not enough seed, so perennial grasses were not sown (United Press International, 1963).

Some papers were concerned about erosion problems caused by the ploughing of meadows. In the south of the Soviet Union, in the first year of the “promising perspective of opening up the virgin lands”, more than 50,000 hectares of meadows were ploughed up on sandy and sandy loam soils. All of this area was immediately turned onto wind-blown sand drifts. This phenomenon, termed a “disaster” by one paper, later spread over the entire Caspian coastal area and the virgin lands.

The paper *Komsomol'skaya Pravda* (in 1964, just a few months before Khrushchev's resignation), published an article about erosion in the Black Earth regions. In Voronezh oblast more than 500,000 hectares, including 200,000 hectares of fallow land, had been lost because of the disastrous effects of soil erosion. As the reason for the annual loss of thousands of hectares of land to erosion in the Central Black Earth region, the author gave the following explanation: “They have been carried away with the mastery of so-called virgin lands in the Black Earth region. They rashly exposed many meadows and pastures on the sides of hills, on river banks, and around ponds.” These exposed areas ought to have been planted with grass. But, notes the author, at that time “ill-fated grassland agriculture had come under extremely heavy fire”, so specialists decided to do nothing. “The time was bad. We would be heavily criticized.”

The poor condition of pastures as a result of the virgin land campaign was also widely discussed. A chief specialist for sheep breeding in the USSR Ministry of Agriculture stated that because natural pastures in the USSR had been ploughed up, the period during which sheep were kept in stalls had been prolonged. Moreover, the production of hay had decreased sharply owing to the poor management of the meadows. Pastures had been subject to waterlogging and had become overgrown with bushes. This had compelled many kolkhozes and sovkhoses to reduce their sheep breeding. In the Ukraine, in 1963 alone, the number of sheep on kolkhozes and sovkhoses decreased by 14 percent; in Belorus by 28 percent; and in the Baltic republics by 22 to 26 percent. In the Ivanovo, Kostroma, Yaroslavl, Orel, and Smolensk oblasts, the number of sheep decreased by one-third (*Pravda*, 1964a).

The shortage of hay reserves put greater pressure on pastureland. The most remarkable example is the Kalmyk pasture, which had also been partly ploughed during the virgin land campaign. Between 1961 and 1963, pressure on the remaining pasture in the Kalmyk provinces had increased, since many farmers from the neighboring Stavropol, Dagestan, Astrakhan, and Rostov provinces brought in their flocks of sheep. Thousands of shepherds were reported to be passing the winter in the black earth region of Kalmykia. Almost 2.5 million sheep were grazing in these open-range pastures. The mild, relatively snow-free winter and the bountiful pastures allowed livestock to be provided with grass almost all the time, but the pastures became overgrazed and poorer. Some kolkhozes and sovkhoses were keeping their sheep in the area all the year round, thus exhausting and destroying the pastures. The amount of wind-blown sand had sharply increased in the last decade. However, no radical measures for improving the pastures had been undertaken, according to *Pravda* (1964b).

All these publications clearly indicate that in the early 1960s, serious opposition to the agricultural policy of Khrushchev appeared in all strata of Soviet society (writers, local administrators, top-level agricultural experts). The virgin lands campaign had brought neither the expected increases in grain harvests nor an abundance of fodder for the country. A rapid turnover of agricultural officials, ousted from their posts for failing to meet plan targets, had been a symptom of the deep crisis in Soviet agriculture. From 1960, three ministers of agriculture had lost their posts along with countless lesser officials. A large number of collective and state farms saw their chairmen replaced two or three times in a single year (*Stalin's collective farm system*, 1964).

In February 1964, Premier Khrushchev openly acknowledged the fallibility of his virgin land program. Khrushchev was reported by foreign media to have said that the wheat-growing virgin lands were plagued by repeated droughts and soil erosion and would be turned back to grazing. The Soviet leader suggested that the 100 million acres planted with wheat over the last ten years, despite the hazardous climate, had performed a "useful role in a particular period" of Soviet economic development. But he added (in a talk with an Italian publisher) that this territory would no longer be planted with crops after the progress via the present fertilizer and irrigation programs had begun to pay off with higher yields per acre in the more favorable farming areas of the Soviet Union (*New York Times*, 1964a).

Western journalists noticed that a party-government statement published on the front page of *Pravda* made no mention of such a long-term plan (it was a joint statement of the Communist Party and the government, marking the tenth anniversary of the program) (*New York Times*, 1964b). Several months later (in October 1964) Khrushchev was conspiratorially replaced by Leonid Brezhnev in the post of secretary general of the CPSU. His “voluntary and non-scientific” approach was severely criticized by the October Plenum of the Central Committee of the CPSU in 1964. No protest in Soviet society against the departure of Nikita Khrushchev is known.

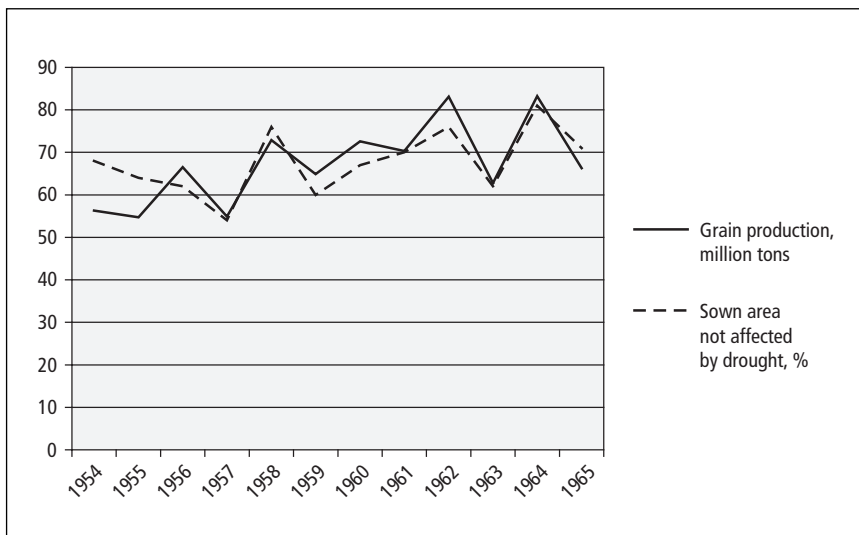
7.2. Weather variations and agricultural production

The start of the virgin lands campaign in 1954 made harvests in northern Kazakhstan and the south of Western Siberia crucial to the performance of Soviet agriculture as the whole. The virgin lands of Kazakhstan and Western Siberia were characterized by specific and severe climatic conditions in comparison with traditional grain-producing areas of Russia, where the soil and the climate were still marginal by Western European standards. The geographic location of Kazakhstan, in the center of a large continent with the axis of extreme barometric pressure traversing its northern part, makes its climate generally very windy, dry, and continentally severe. This is a region of weather extremes. It has a typical continental climate, cold in winter and hot in summer. Winter begins in November and ends in March. In the winter, temperatures stay at 40 degrees celsius below zero and swirling snow reduces visibility to less than a few meters. Summer provides little relief. Winds often blow at 65 miles an hour and the parched topsoil is eroded to produce ominous clouds of rolling dust.

Precipitation is the crucial factor for farming here. Annual rainfall varies from a low 200 millimeters to a barely sufficient 300 millimeters. In the United States, farming experts do not consider cultivating non-irrigated land unless the rainfall is above 400 millimeters (Robinson, 1978). A strong correlation (more than 0.8) between the regime of precipitation and yields of spring wheat was observed in the virgin lands of Kazakhstan (Uteshev, 1963).

Overall, the period between 1954 and 1965 was certainly not blessed with good weather in the new agricultural zone of the USSR. At least four years—1955, 1957, 1963, and 1965—out of the ten were very

Figure 7.2. Grain production and scale of drought in the RSFSR, 1954–1965



dry in Kazakhstan and Western Siberia as well as in many regions of the Russian Federation (Figure 7.2.). Other key agricultural regions of the USSR, such as the Ukraine, suffered from severe droughts in 1954 and 1960. Weather did little to help Khrushchev's agricultural projects. One Soviet report evaluates 1960 to 1965 as the worst in Kazakhstan in terms of climate in the period 1946 to 1975 (*Agroklimaticheskyy prognóz*, 1978). Evidently the weather was not the only factor in the colossal losses of harvests in the virgin lands in those dry years, as inappropriate methods of cultivation (which were good in wetter conditions) exposed soils to wind erosion in the dry steppes of Kazakhstan and Western Siberia.

Already in the first year of the campaign, 1954, there was a drought in eastern and southern parts of the Ukraine. In this region the large losses of grain were reported to be caused exclusively by the dry autumn weather of 1953 and then by drought in the spring and summer of 1954 (*Agroklimaticheskyy prognóz*, 1978). The total grain production of the USSR fell by 24 percent below the average, mostly due to crop failure in the Ukraine, as the grain production of the RSFSR was relatively high (Table 7.8.). In the virgin land area of Western Siberia and Kazakhstan, new grain sovkhozes enjoyed rainy weather and relatively good harvests (Rudenko, 1958).

Table 7.8. Grain production (millions of tons) and grain yields (centners per ha) in the USSR and in the virgin lands of Kazakhstan

Indicator	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
USSR												
Grain production	85.6	106.8	127.6	105	141.2	125.9	125.5	130.8	140.2	107.5	152.1	121.1
Yield	7.6	8.5	10	8.4	11.3	10.5	10.9	10.7	10.9	8.3	11.4	9.5
Kazakhstan												
Grain production	7.7	4.8	23.8	10.6	22	19.1	18.7	14.6	15.9	10.6	23.6	7.6
Yield	9.2	2.9	10.6	4.6	9.4	8.6	8.5	6.6	6.5	4.4	9.8	3.1

Source: *Narodnoe khozyastvo v 1965, 1966.*

This situation, however, was reversed in 1955 when Western Siberia and Kazakhstan suffered from an extensive drought while wet weather prevailed in the Ukraine and some central regions (Central Black Earth). This year was one of the worst in the virgin lands. In Kazakhstan, average grain yields fell to 2.9 centners per hectare (Table 7.8.). According to the report, production fell by 54 percent and reached the lowest level of the period between 1954 and 1965. Soviet papers said that no rains were observed from April to July. Official meteorological sources reported more precisely that in this period precipitation reached only 44 percent of the average, and this was the lowest among the driest years in the last century. This period (April to July) was also characterized by high temperatures—1.4 degrees above the norm. According to the report (*Agroklimaticheskyy prognos*, 1978), precipitation in April to July is the most important (by 89 percent) for grain harvests in Kazakhstan.

The year 1955 was also extremely unfavorable in the Volga basin. For example, in Saratovskaya province no rain was observed during the whole summer and dry hot winds damaged the crops (*Sel'skoe khozyastvo Povolzhya*, 1955). In Samarskaya province, negligible amounts of precipitation in winter and dry and hot weather during the growing period caused a considerable decline in the harvest (*Sel'skoe khozyastvo Povolzhya*, 1957). In the Urals region, precipitation was only 50 percent of the average in June, and the total loss of crops was estimated at 34 percent.

In total, in 1955 the Soviet press reported that around 5,000 sovkhozes throughout the USSR were operating at an average annual

loss of 15,000 rubles each. A more definite figure for 1955 was given by a Soviet official: "... the sovkhozes (of the USSR) finished 1955 with a loss of 56 million rubles, instead of a planned profit of 30 million rubles" (*Kazakhstanskaya Pravda*, 1956).

The bumper year 1956 brought the highest yields of the nine-year period to the virgin lands of Kazakhstan and Western Siberia. A remarkable admission was made by a Soviet official, who said that in 1956, for the first time in the system of new grain sovkhozes, the monetary return was more than the expenditure (*Kommunist*, 1958). Weather conditions in 1956 were also favorable for crop growth and development in the Volga basin. The soils were well watered by the snowy winter and rainy spring, which resulted in healthy young growth in the spring crop. A dry July caused a slight deterioration in crop condition and the harvest was poorer than expected (*Sel'skoe khozyastvo Povolzhya*, 1957).

The next year, 1957, brought the second-lowest yields of this period and, presumably, great losses to the new grain sovkhozes. Among the reported causes of the poor harvest in Kazakhstan were drought and pests (butterflies and caterpillars). These latter affected an area of more than 7.3 million hectares. Because of the pests alone, losses in grain production were estimated to reach 2.4 million tons and the total grain production amounted to 10.6 million tons (*Problemy selskogo khozyastvo*, 1967). The cereal yield was only 4.6 million tons, almost 50 percent lower than planned (Table 7.8.).

In the areas of traditional farming the year was also very unfavorable. It was reported that in 1957 a stable anticyclone was positioned south of the Urals and its well-developed offshoot spread far to the west (Buchinsky, 1974). In that year, one of the largest droughts was observed in the Volga region. In May and June, the most important months for crop growth, only 45 percent of normal precipitation fell while the temperature in May was 4.9 degrees above average, a record for this region (*Agroklimaticheskyy prognoz*, 1978). In the North Caucasus, severe dust storms were observed. In Stavropolskay krai, about 400,000 hectares of crop (about 20 percent) were damaged and partly destroyed by a dust storm. In Rostov oblast this figure reached 120,000 hectares (Buchinsky, 1974).

The year 1958 was good throughout most of the country. But even in this year, as reported in the media, the situation was not favorable everywhere in Kazakhstan. "In Kustanai oblast (Kazakhstan) alone, of the 157 sovkhozes 144 did not achieve the planned profits... The main

Table 7.9. Grain production in some economic regions of the USSR between 1960 and 1965 (millions of tons)

Regions	1960	1961	1962	1963	1964	1965
USSR	125.5	130.8	140.2	107.5	152.1	121.1
RSFSR	76.2	73.7	86.7	65.8	87.0	69.7
Central Black Earth	6.1	8.6	9.0	5.3	9.4	8.6
Volga	17.0	16.3	22.8	16.5	22.4	17.0
N. Caucasus	13.3	13.4	17.0	15.5	15.5	13.0
Urals	12.1	9.5	12.1	9.2	11.2	7.5
W. Siberia	14.5	12.8	10.1	4.9	13.5	6.5
Kazakhstan	18.7	14.6	15.9	10.6	23.6	7.6
Ukraine	21.8	34.0	28.7	21.9	30.4	31.6

Source: *Selskoe khozyastvo v SSSR v 1970*, 1971.

losses of sovkhozes in the republic occurred in Kokchetav and North Kazakhstan oblasts” (*Kazakhstanskaya Pravda*, 1959). In 1959, average yields in the virgin lands were lower than in 1958. It was reported that 491 sovkhozes in Kazakhstan finished the year with losses totaling 97.6 million rubles instead of the planned profit of 50.6 million rubles. As a result of such unsatisfactory management in the sovkhozes of the republic, the state bore an overall loss of 113.5 million rubles in 1959 (*Kazakhstanskaya Pravda*, 1960).

The next five years, from 1960 to 1965, were recognized by the Soviet authorities as disastrous for Soviet agriculture. According to our estimates (see Figure 7.2.), the poor years—1960, 1963, and 1965—were not the driest in the decade. Some other additional weather factors, such as dust storms and a severe winter, also had an impact. More importantly, the growing grain imbalance caused by a 1.5-fold increase in the Soviet herd since the late 1950s, made the crop failures in 1963 and 1965 disastrous for the livestock sector. In absolute terms, the harvests were at the same level as in 1955 or 1957 but the grain deficit was incomparably higher in 1963 and 1965 (see Table 7.3.). Importantly, statistical data on grain and meat production are available for regions of the USSR for this period in order to detail the effects of the droughts (Tables 7.9. and 7.9.1).

In 1960, the southern regions of European Russia suffered from dust storms in the spring. The first were reported over Romania and moved westward into Hungary and Yugoslavia. Romanian meteorologi-

Table 7.9.1. Meat production in some economic regions of the USSR between 1960 and 1965 (thousands of tons)

Regions	1960	1961	1962	1963	1964	1965
USSR	8,682	8,700	9,462	10,195	8,287	9,956
RSFSR	4,492	4,455	4,867	5501	4171	5,203
Central Black Earth	397	383	449	576	324	484
Volga	750	793	832	929	739	926
N. Caucasus	640	698	734	773	696	823
Urals	463	493	512	586	436	549
W. Siberia	541	522	606	722	403	626
Kazakhstan	545	615	648	665	458	763
Ukraine	2,068	2,092	2,320	2,417	1,836	2,221

Source: *Selskoe khozyastvo v SSSR v 1970*, 1971.

cal sources said strong winds originating in Kazakhstan and the south Ukraine, blowing in an east-west direction, caused successive waves of dust clouds over the country on 7 and 8 April. Radio Moscow (1960) announced that dirty rain had fallen in the area around Kiev. One of the central papers, *Izvestia* (1960), praised “17 gallant collective farmers” who fought against the ravages of a “catastrophic” dust storm in Krasnodar territory (North Caucasus), which occurred from the 19 to 23 March.

One French magazine (September 1960) again suggested that the dust storms that had occurred in recent years in the southern regions of the USSR, as well as in Romania and Hungary, could have originated in Kazakhstan as a result of improper agricultural practice (*Dust storms in the USSR*, 1960).

Later, the journal *Izvestia Academy of Sciences (Izvestia Akademii Nayk*, 1961) published an article by three Soviet geographers, who argued that the dust storms did not stem from the steppes of Kazakhstan. The article gave some details about the storms. The first occurred between 13 to 16 and 23 March 1960 and covered the western slopes of Stavropol krai, south Yergeni, the Kuban valley, the western part of the Caspian lowland (North Caucasus), and a vast belt of Black Sea lowland up to the Dnieper valley in the Ukraine. Wind velocities reached 12 to 24 meters per second. The second dust storm took place a month later, between 3 to 6 and 17 April, and covered an even greater area, including the Moldavian plateau. These dust storms caused great damage to winter crops. The total area of agricultural land destroyed by this dust storm

exceeded four million hectares. In some areas the fertile humus layer was completely blown away by the wind. The authors note that in the North Caucasus and southern Ukraine, strong dust storms were also observed in 1946, 1952, 1953, and 1955. However, they stated, the dust storm of 1960 was one of the strongest in the history of the regions and comparable with the dust storms of 1892 and 1928. The eastern regions of European Russia (Low Volga, Caspian lowland), as well as Western Siberia and northern Kazakhstan, did not suffer from the storm.

According to official statistics, in 1960 grain production in the Ukraine fell by 28 percent and in the Northern Caucasus by 15 percent (below average levels for the decade; see Table 7.9.). In total, in 1960 the dust storm damaged more than 6 million hectares of the winter wheat crop and a considerable part of the crop area had to be replanted (*Vestnik sel'skokhozyastvennoi nauki*, 1963). In the North Caucasus alone, 2.5 million hectares (about 30 percent of the total sown area) were damaged (Buchinsky, 1974). Official statistics indicate that there was also a drop in grain production in the Black Earth region (perhaps due to other reasons, as shown below). The total grain production of the USSR was 20 percent below the average level.

Soviet statistics show a decrease in total meat production in the RSFSR, which had also shown overall stagnation in the USSR during 1960 and 1961 (Table 7.9.1.). The growth in livestock numbers in 1960–1961 was the lowest since 1957, when the state meat program started. The total number of cattle increased by only 2 percent, while in the previous years the figure had been 5 to 8 percent. The recession took place mainly as a result of a combination of different economic and political factors (see Chapter 7.1.). However, the poor weather also seemed to have been an important additional factor in exacerbating the livestock crisis in 1960–1961.

The winter of 1959–1960 was bad for livestock, resulting in losses that came mainly as a result of poor overwintering conditions. The winter was more severe than normal in a number of areas, and the development of spring pasture was delayed by a late, cold spring. Then dry weather came. Less feed was stored in the fall of that year than normal. Under these circumstances, the condition of the livestock deteriorated and the spring calf crop (as well as the young of other animals) was not as large as expected. Many kolkhozes and sovkhoses had to purchase animals from the private sector in order to improve their animal stocks by the end of the year (Gamburtsev, 1961).

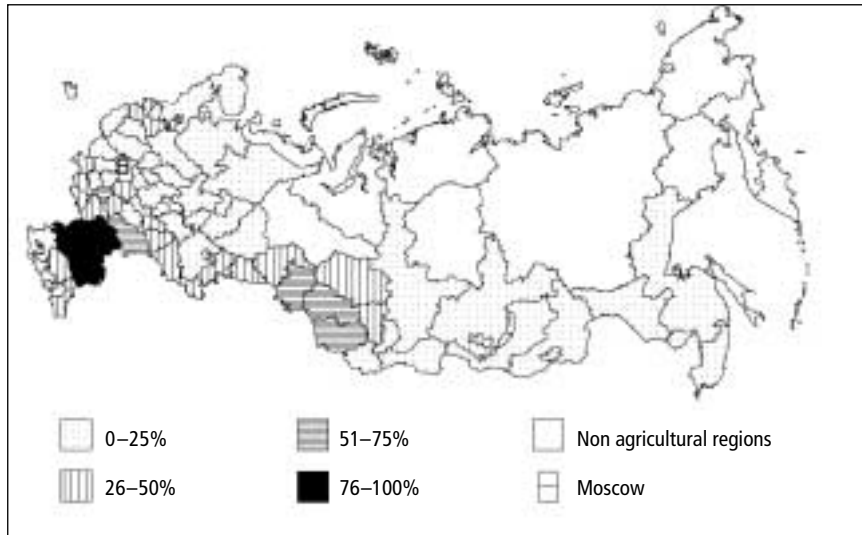
The severe winter could also explain the decline in grain yields in many central (including the Central Black Earth belt) provinces in 1960. For example, in Novgorod, Ryazan, Vladimir, and Ivanovo provinces, the cereal harvests were stated in official reports to be between three and five centners per hectare (*Narodnoe khozyastvo SSSR v 1960*, 1961).

In 1961, grain production faced problems because of droughts and wind erosion in Kazakhstan, Western Siberia, and the Urals. In the Pavlodar district of Kazakhstan, 700,000 hectares of crops were reported to be damaged by wind erosion. Kazakhstan grain production was 14.5 percent lower than average. In Khakasii (Western Siberia), 38 percent of the crop area was damaged by wind erosion (*Vestnik sel'skokhozyastvennoi nauki*, 1963). In the Urals region grain production fell by more than 22 percent (Table 7.9.).

The year 1962 was again bad for some districts of Kazakhstan and Western Siberia, resulting in a relatively low harvest. In Kazakhstan, a local paper wrote the following comment: "In Tselinny krai (the virgin land krai), 572 sovkhoses ended up last year with losses of astronomical proportions—nearly a quarter of a billion rubles" (*Kazakhstanskaya Pravda*, 1963). It was reported that in the Kokchetav district of Kazakhstan, sovkhoses suffered badly because of severe drought (*Problemy sel'skogo khozyastvo*, 1967). Altai krai, the major grain basket of Western Siberia, could provide the state annually with 8.8 to 9.6 million tons of grain, but in 1962, because of drought and disorganization, was able to deliver a little over 0.9 million tons rather than the 4 to 4.8 million tons pledged to the state (*Sovetskaya Rossia*, 1962). Among the difficulties reported were the poor quality of seed and poorly maintained machinery (*Difficulties in the Altai virgin land*, 1963). One more major agricultural region of Western Siberia, Novosibirskaya oblast, also delivered to the state a negligible amount of the grain—0.4 million tons instead of the planned 1.5 to 2 million tons (*Pravda*, 1962). Official statistics confirm the relatively low harvests in Kazakhstan and Western Siberia in 1962 (Table 7.9.), but the other regions enjoyed a good harvest. For example, it was reported that an excellent harvest was obtained in the Volga basin (the best for a decade) (*Sel'skoe khozyastvo Povolzhya*, 1963).

The drought of 1963 was a key event for the Soviet economy. Any hope of delivering a grain excess in the virgin lands vanished. In that year, the grain harvest was the lowest for the decade. The drought affected both European and Asiatic parts of the country, which was a relatively rare event. Figure 7.3. shows, however, that the drought did

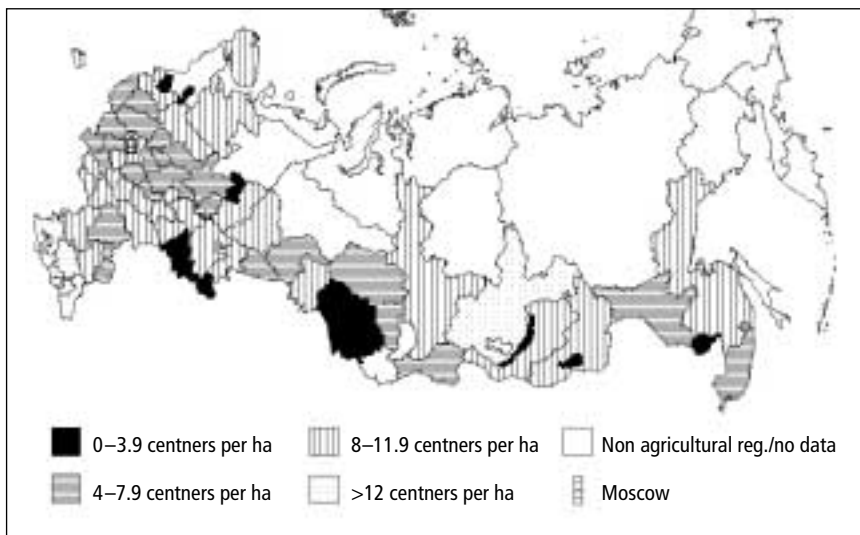
Figure 7.3. Area affected by drought in 1963



not appear large enough to cause such a serious shortfall in grain production (by 27 percent below average). The area affected in 1963 was less than that in 1957 or 1965, when crop failure had been lower (*Agroklimaticheskyy prognóz*, 1978). It is likely that the problem emerged due to the winter of 1963 damaging the winter crop and then the dry summer affecting the spring crop (Kokol, 1962). A comparison of the two Figures 7.3. and 7.4. confirms this position. It shows that a vast area in the central part of European Russia, although not affected by drought, was characterized by a low harvest that year.

The drought of 1963 did not penetrate far into the northern region but covered the south of European Russia, Western Siberia and northern Kazakhstan. The most affected regions were those growing wheat. The problem was that the drought came after winter when the winter crop had been frozen. Due to cold weather in March (1963) in the southern part of European Russia, the vegetation growth period began 10 to 15 days later. The sowing of the spring crop started later, and young growth appeared 10 to 12 days later than in a normal year. In the last 10 days of April, dry, warm weather arrived. In May, the crop developed quickly because of this weather. The winter crop was damaged by the cold winter and plants were weak and continued to deteriorate in the dry weather conditions of the spring. Over a large area the plants

Figure 7.4. Cereal yield in 1963



only grew 30 to 40 centimeters high. In Kievskaya, Khersonskaya, and Volynskaya provinces of the Ukraine, the precipitation deficit reached 148, 155, and 205 millimeters respectively. The poorest winter crops were observed in the Volga basin, the southern part of the Central Black Earth region, the eastern part of the Ukraine, in Rostov and in the northeast of Stavropol (Yakovlev et al., 1964).

That year's bad crop in the virgin lands coincided with a poor harvest in the normally rich agricultural lands. In Kazakhstan, many districts failed to harvest even enough for the following year's seed-grain requirements. The average yield dropped to 3.2 centners per hectare. Grain production reached only 38 percent of the average harvest (Table 7.9.). Dust storms were observed in the virgin lands. These swept over 120,000 hectares of land belonging to the Pavlodar production board alone, and 64,000 of these had to be re-ploughed (*Kazakhstanskaya Pravda*, 1963). In total, wind erosion damaged about 3 million hectares in Kazakhstan, 0.8 million hectares of which were arable land. A local paper stated that "hundreds, and even thousands, of hectares of arable land have to be ploughed over every year" (*More Data on Dust Storms*, 1963).

The virgin lands of Western Siberia also suffered because of dust storms. In Altai krai the average yield dropped to 3.4 centners per

hectare. The grain production of Western Siberia was 42 percent below the average (Table 7.9.).

In the Black Earth regions, grain production reached only 58 percent, in the Middle Volga 68 percent, and in the Ukraine 72 percent of the average level. In the Ukraine, the drought of 1963 was especially prolonged. It affected all southern and eastern districts of the republic and continued from April to August, with a peak in July. In 1963, in the southern Ukraine (Nikolaev), only 19 percent of normal precipitation fell during the three main plant-growth months, while the norm was 90 to 120 millimeters. As a result, the spring crop was damaged because of the very dry weather conditions in the autumn of 1963 (Buchinsky, 1974).

Thus most regions of the USSR faced crop failure. Relatively good weather was only observed in the North Caucasus and harvests there were about average. The grain deficit was estimated to reach about 40 million tons.

The poor weather of 1963 brought the deepest crisis for the livestock sector in the history of the USSR. An official statistical report gives some figures on the livestock crisis in 1963 (although it gives no figure for the size of grain harvests). The production of butter fell by 7 percent, and the output of milk and eggs was also down. But the output of meat rose by 10 percent in the USSR (Table 7.9.1.). This increase was achieved by recourse to the “fantastic” (according to the words of the *Economist*) slaughtering of pigs. At the beginning of 1963 there were 53.8 million pigs belonging to the state and collective farms, and 16.1 million belonging to individual farmers; by the end of the year, the respective figures were 27.6 million and 13.1 million. Apparently, half the pigs in state or communal ownership were slaughtered (Table 7.9.2.). Such a fall in pig numbers had been observed before only in the period of collectivization and the war (*Economist*, 1964).

The size of the sheep flock fell from 139.7 million to 133.6 million, or by 4 percent; and that of the goat herd from 6.7 to 5.6 million, or by 16 percent. The cattle herd decreased slightly less, as apparently a decision was adopted to thin the pig herd because of a higher rate of recovery by these animals. The cattle herd fell from 86.9 million to 85.3 million, or by 2 percent. As a result, the size of Soviet animal stocks, in terms of convenient units, decreased by 38.2 million, or 13 percent, in 1963. The report of the Central Statistical Board “On the results of the fulfillment of the plan for the development of the economy of the USSR in 1963” (dated 24 January 1964) revealed that “in connection with the

Table 7.9.2. Soviet livestock (as of 1 January)

Year	Horned cattle	Cows	Pigs	Sheep and goats
1954	55.8	25.2	33.3	115.5
1961	75.8	34.8	58.7	140.3
1962	82.1	36.3	66.7	140.5
1963	86.9	37.9	69.9	146.3
1964	85.3	38.2	40.7	139.2

Source: *Economist*, 1964.

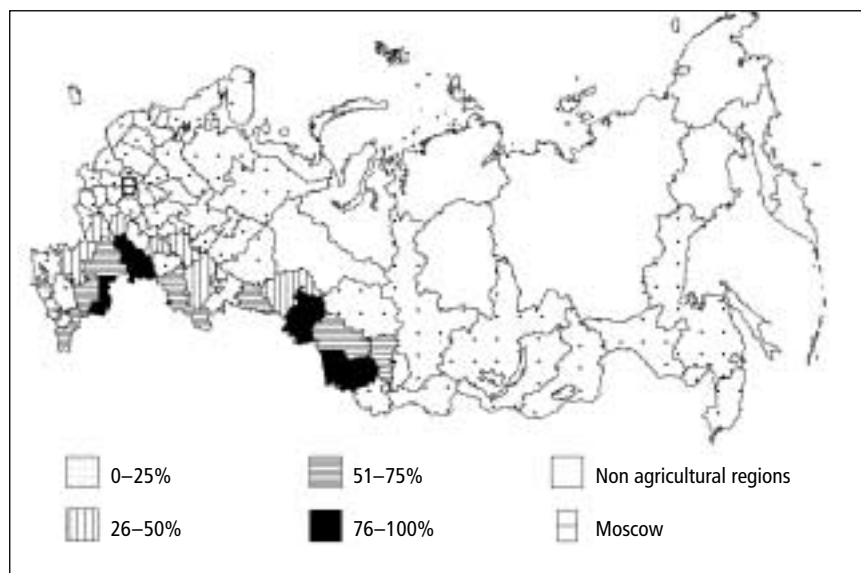
shortage of feed, collective and state farms conducted, in an organized fashion, a larger than usual thinning out of herds at the end of the year, preserving female livestock” (*Pravda*, 1964).

It was evidently bad luck for Nikita Khrushchev that the large drought came after the year of his price reform. The reform of 1962 decreed that there should be a considerable increase in the prices to be paid to the farms for milk and meat. The farms responded very handsomely, so much so that the cattle population explosion also burned up considerable amounts of grain and feedstuff, much faster, in fact, than they were being produced. The additional requirements of grain amounted to something like five million tons (*Guardian*, 1963). As the harvest of 1963 yielded almost 32 million tons of grain less than in 1962, a catastrophe was to be expected.

The next year, 1964, the harvest from the virgin lands augured well, and even surpassed the record crop of 1956. That year the USSR had very good omens for such a high harvest. The winter lasted longer than usual, spring came later, and soils in most agricultural regions had good moisture reserves. The winter was snowy even in the virgin lands region, and during the spring rainy weather prevailed. The area of southern Ukraine most affected by the drought of 1963 was already in good condition in relation to soil moisture reserves. Heavy rains were observed in the North Caucasus in May, which improved conditions for crops after a too dry March and April. Good weather was also observed in the Central Black Earth region and in the Baltic republics (Popluiko, 1964). The USSR experienced the best harvest in the decade—more than 150 million tons.

At the same time, there was an unprecedented decline in meat production (by 19 percent in the USSR and by 24 percent in the RSFSR) as a result of the large-scale and disastrous slaughtering that had taken

Figure 7.5. Area affected by drought in 1965



place in 1963 (Table 7.9.1.). The single good harvest did little to help the difficult situation in Soviet agriculture. In its annual review, the Department of Agriculture of the United States confirmed that, despite a good harvest in 1964 in the USSR, the gross agricultural production per capita had fallen compared with 1958. It said that at best for 1965 the harvest would be not very high and it should be expected that wheat production would be lower than in 1958. According to American livestock experts, it would take many years to restore the size of the Soviet herd after the catastrophic drop in numbers in 1963 due to excessive slaughtering (*State of Soviet agriculture*, 1964). This analysis was correct, as in the Russian Federation the restoration of the Soviet pig herd took eight years (up to 1971–1972), and sheep and goat flocks never recovered to the level of 1963 (*Selskoe khozyastvo v Rossii*, 2000).

The analysis was also correct in suggesting serious consequences if the weather in 1965 were unfavorable. The next year, 1965, brought a severe drought once again. The drought belonged to the eastern type (Figure 7.5.), with the most affected areas being the virgin lands of Western Siberia and northern Kazakhstan. That year was the most disastrous since the virgin lands of Kazakhstan were first put under the plough. The five major oblasts of northern Kazakhstan managed to sell to the

state only 1.2 million tons rather than 9.9 million tons (*Erosion losses described*, 1966). Although during the spring precipitation was higher than in other years of drought, the extremely dry July (with precipitation only 50 percent of the norm and temperatures exceeding the average by three degrees) caused the largest losses of harvest (spring wheat) in the post-war period. Soviet experts estimated that in 1965 grain losses were higher than 50 percent (*Agriklimaticheskyy prognos*, 1978).

The main problem was associated with strong, hot winds. The director of the Tselinograd branch of the Kazakh SSR Academy of Sciences (*Selskoe khozyastvo Kazakhstana*, 1965), K. Faizov, linked the poor harvest with wind erosion: "Last spring gale-force winds lifted the top soil in the Tseliny krai [virgin lands] causing extensive dust storms. Agricultural production in the krai sustained heavy losses as a result of erosion. The fertility of the land decreased sharply and thousands of tons of constituents necessary for plant growth were lost. Wind erosion in the virgin lands area is becoming more and more menacing each year. Inadequate measures to combat erosion could lead to the loss of all 13 million hectares of erosion-prone arable land" (*Tackling the Problem of Soil Erosion in Kazakhstan*, 1965).

The wind erosion in 1965 affected more than 5 million hectares of virgin lands (*Problemy selskogo khozyastvo*, 1967). This erosion occurred not only in Kazakhstan and Western Siberia, but also along the left bank of the Volga, in Rostov oblast, Kuban (North Caucasus), and in certain southern oblasts of the Ukraine. For example, in Krasnodar krai (Northern Caucasus) alone, losses totaled 400,000 hectares of winter wheat. The poor harvest in the Volga basin in 1965 was connected mainly with *sukhoveii*. During the vegetation period, moderate amounts of precipitation fell (96.5 mm) but the harvest was lower than in 1966 when precipitation had reached only 62.5 millimeters. The problem was the dry wind that affected the regions for 34 days, 14 of which occurred in the most important period of crop growth (*Selskoe khozyastvo Povolzhya*, 1967).

Poor management was also a factor in the poor harvest of 1965. In north Kazakhstan (the virgin lands) and Western and Eastern Siberia, the winter was so long and the spring was so short that many farms did not have time to prepare the land before sowing time, leaving them threatened with heavy infestations of weeds. In the central zone crops were sparse because the land had not been properly cared for in previous years. Spring crops, which accounted for about 60 percent of the Russian

wheat harvest, suffered from lack of rain and from extremely hot weather (*Manchester Guardian*, 1966). The single exception was the Ukraine, where winter crops produced good yields everywhere (Table 7.9.).

The poor harvest of 1965 was to bring new problems for the livestock sector, which was on its way towards recovery after the disaster of 1963. Official statistics show, remarkably, that meat production increased in 1965 (Table 7.9.1.). This growth indicates that slaughtering was again very high that year. Besides the fodder shortage of 1965, one further reason was reported in the Western press. Serious milk and meat shortages were expected in the Soviet Union in 1966 as a result of the spread of foot-and-mouth disease, affecting almost one-third of the country's total cattle herd. Large numbers of livestock had to be destroyed, while the surviving animals probably yielded less milk. The disease spread to the Soviet Union's best European provinces. About 30 million heads of cattle, as well as swine, sheep, and goats, were reportedly affected. Part of the large livestock deliveries to the state had been due to the premature slaughtering of affected cattle and small animals. The United States veterinarians, familiar with the conditions of livestock farming in the Soviet Union, thought that the year's severe outbreak might have been caused by moving livestock over large distances. Many livestock were redistributed during the summer in order to improve breeds or to develop livestock farming in regions where farms had hitherto concentrated on raising crops. Other animals had been moved around to escape the drought (*Christian Science Monitor*, 1965).

7.3. Food problems

"There is meat being sold in Kiev", goes a Moscow anecdote "but you will have to go to Kharkov if you want to buy any." "Why Kharkov?" "Because that's where the queue ends."

There is a general shortage of information about food problems in the regions of the USSR for any of the years from 1954 to 1965. No statistics or official documents on this subject have been published in the Soviet Union. Even the most valuable source of information on food problems, the media, did not carry much information on the situation in the regions of the country for the poor years of the decade. The Soviet press rarely featured unfavorable weather conditions affecting agricul-

ture. Only when corrective measures were being mobilized to overcome a lag in farm operations did the press generally mention adverse climatic conditions. However, the food crisis of 1960 to 1963 did receive some comment in Soviet and Western media.

This crisis was a very important event in the history of food problems in the Soviet Union, as it resulted in a radical change in the relationship between the state and farmers. Although the latter would still be under full political and economic control, the state gradually took on some of the burden for crop failure caused by unfavorable weather conditions. The Soviet government gradually took on responsibility for food supply to all categories of the Soviet population, including farmers in poor years. Our suggestion is that this new social reality had been shaped in the dramatic events in 1960 to 1963, when a new deep and long-term food crisis shook the USSR.

The food situation in the Soviet Union was aggravated at the end of 1950 due to a recession in the livestock sector. According to official Soviet statistics, meat production in 1960 was lower than in 1959, instead of growing as planned. The same decline was observed in milk production. At the same time, there was a rapid growth of the population in Soviet cities. During 1960, the urban population increased by 4.6 million—from 103.7 to 108.3 million (by 1 June 1961 this figure reached 110 million). The winter of 1960–1961 was very problematic because of a poor supply of meat and milk produce to the urban population. A clear indication of these problems was given by the plenum of the Central Committee of the CPSU in January 1961. A top official, Polyansky, reported the poor situation in the Russian Federation: “In a number of cities an interruption in the supply of meat and dairy products is taking place.” Another top official, Podgorny, said that in the Ukraine an “interruption” in supplies of meat and milk produce could also be observed (*Pravda*, 1961). In the summer of 1961 the situation changed little. A serious decline in the amount of meat for sale was registered in some central cities. For example, on 14 July of 1961 the journal *Sel'skaya Zhizn* (Country life) reported that only 19 percent of the plan for meat sales had been fulfilled during six months in Vladimir province. According to an official statistical report, in 1961 the amount of meat sold to the population was 96 percent of that in 1960, while sales of sausages and milk reached only 1 percent above those of 1960 (Maistrenko, 1962).

The crisis became much more acute in the following year, 1962, due to the reform of purchase and retail prices for meat and dairy prod-

ucts implemented that year. To achieve the reasonable targets for raising prices and cutting expenditure, the Soviet government adopted a plan to raise the retail price of food. The prices the government paid to collective farms for livestock and dairy produce was to increase by 30 percent and 25 percent respectively. Purchase prices had been raised in 1953 and again in 1956 and 1958. In the course of these earlier reforms, retail prices for meat (as well as grain, vegetables, and potatoes) had remained unchanged, but the reform of 1962 brought increases here too.

The new retail prices were set on 1 June 1962. Information on the resolution appeared that day, and within a few days information had already emerged about mass protests by the Soviet people against the rise in meat prices. In 1961–1962 the minimum wage in Soviet cities was 30 to 35 rubles a month and in rural areas 27 to 30 rubles, while meat cost from 1.5 to 4 rubles per kilogram and butter from 2.9 to 3.6 rubles per kilogram (*Sotsialistichesky Věstnik*, 1962). One kilogram of average-quality beef and butter already cost the equivalent of 3.5 and 9 hours' work respectively for anybody earning an average wage of 80 rubles a month (compared to 1.5 and 1 hours in Britain). Thus the price rises would have been a very sensitive issue in terms of the family budget of a Soviet citizen. The situation was aggravated by a decrease in actual wages caused by the lifting of the norm of industrial production.

The most dramatic incidence of protest against the rises in the price of food occurred in the city of Novochoerkask in Rostov province (North Caucasus). An official KGB document published recently says that the riot began on 2 June. About 4,000 workers from a local plant participated in a meeting. That night, the workers were surrounded by the military and dispersed. However, the next morning some thousand workers resumed the strike. It was reported that about 5,000 moved into the city but were soon stopped by troops. According to official sources, 23 were killed and 70 were wounded in the clash. Hundreds were arrested. Already by late August a court session had convicted 132 people. The sentences showed similar cruelty to that known under Stalin. Seven workers were sentenced to death by firing squad (Kisilev and Shagin, 1996). The court session was given much publicity in the USSR for political purposes.

The Western press also published some information on the incident. The *Daily Telegraph* reported on 7 August about the clashes between people and police in Novochoerkask (Rostov oblast). The paper said that

the population had protested against the rising prices and shortages of meat and other staple foods in the stores. It reported that several hundreds had been killed. The Soviet authorities isolated the Rostov oblast from other regions of the country (*Daily Telegraph*, 1962).

The foreign press also reported mass protests in Grozny (Chechya), Donetsk (Ukraine), and Kemerovo (Western Siberia) (*Daily Telegraph*, 1962; *Time Magazine*, 1962; *New York Herald Tribune*, 1962). In Yaroslavl, workers from one factory reportedly went on strike. There was also information about some protest meetings of local workers in Moscow. In the seaport of Odessa, workers went on strike, refusing to load food products on to ships going to Cuba. The Soviet people believed that one of the main reasons for food shortages was food aid from the USSR to its allies.

It is difficult to confirm these reports as the Soviet media hardly mentioned any protests. However, on 11 November 1962, *Sovetskaya Rossia* did report on the mass protest in Kemerovo (Western Siberia). The Soviet media interpreted such events as hooliganism rather than as social protest. In his memoirs, one Soviet academician, Y. S. Varga, mentions more than 15 clashes between workers and the Soviet authorities in 1962–1963 (Kisilev and Shagin, 1996). One modern report states that there can be no doubt that food problems caused protests in many Soviet cities in 1962–1963 (Kont, 1994).

Some Soviet papers wrote about shortages of certain food staples in different regions of the country in 1962. On 10 June, *Pravda* (1962) reported the lack of vegetables in Khar'kov (Ukraine). On 28 June, *Izvestia* (1962) stated that vegetables had become scarce in many large cities, including Moscow, Kiev, Leningrad, Kazan, and Murmansk. Local Ukrainian papers confirmed that citizens of the city of Donbass could not put vegetables on their tables. The very fact that Soviet media published this kind of information was an indication of food shortages throughout the year.

Another indication of the severe food problems was that in the spring of 1963 the two laws "On greater responsibility for feeding cattle and poultry with bread and grain products bought in state and cooperative stores" and "On the norms for cattle in the private possession of individuals who are not kolkhoz members" were issued (*Sovetskaya Rossia*, 1963). These laws were steps in a series of restrictions, dating back to 1956, on private ownership and on feeding grain to cattle and poultry. In 1956 (on 27 August) the Council of Ministers had issued a

resolution which sanctioned a penalty of 500 rubles (or 50 new rubles of 1961) for feeding private livestock with bread, and 1,000 rubles in the case of repeated offences. However, all such measures had proved inadequate. New proposals for a penalty of one year of collective labor, or imprisonment from one year to three years with or without the confiscation of cattle, were brought in. The second law limited the number of cattle in the ownership of private individuals who were not kolkhoz members to one cow and calf or one goat and kid, or one pig and three sheep. Both resolutions appeared after a speech by Khrushchev on 24 April 1963. The Soviet leader warned against the growing spirit of private ownership, but it was clear that behind these problems could be found the underlying problem of grain shortages in the spring of 1963 (*New RSFSR laws*, 1963). It is possible to suggest that these two laws appeared in mid-spring 1963 because the severe winter was already known to have damaged the winter crop in many regions of the country.

Then, in the summer of 1963, severe drought hit the USSR. The grain deficit reached about 40 million tons or 30 percent of the average harvest of the USSR. Besides grain, a shortage of potatoes also emerged. The crop failure of 1963 promised to make the whole situation even more dramatic, and the Soviet authorities were evidently determined to avoid a repetition of the events of 1962 at any cost. The emergence of mass famine was highly probable at that time. The historian N. Vert (1995) states that in 1963 the Soviet Union had to purchase millions of tons of grain as an emergency measure in order to avoid mass famine.

Some informal sources give information about the food crises in several regions of the country in the autumn. For example, on 22 November 1963 the dissident paper *Posev* published information about the subject. According to the paper, in Donetsk (Ukraine) the local population expected food shortages and famine in the winter. The severe drought in the summer killed cereal crops across the oblast. It was impossible to find cabbages in the local market as the crop had been destroyed by the drought. The situation was worse in terms of potatoes. It was also expected that meat would fill local markets because of the mass slaughtering of cattle suffering starvation because of lack of fodder. Bread was still sold in stores but it was already rationed. Bread became the sole accessible staple food. The paper stated that if bread sales were limited it would lead to famine in the winter. The paper also said that in Taganrog (Rostov oblast) food supplies had worsened. In autumn, bread was rationed to no more than one kilogram per person,

but it was possible to buy meat in stores there due to the excessive slaughtering of pigs. The paper wrote that in Orlovskaya oblast (Central Black Earth region), the feeding of private cattle became very difficult in the autumn of 1963.

Again, it is difficult to confirm these informal reports, but the Soviet media gave many indications of the seriousness of the food situation countrywide. A wave of concern about a possible bread shortage appeared to be sweeping the Soviet Union. Articles in the press daily related cases condemning grain theft for pigs and poultry, theft from the current harvest, the feeding of bread to privately owned cows, and the wasteful handling of bread in factory cafeterias and restaurants. Against the background of the unusual publicity campaign, punctuated by such slogans as “Save grain, our national resource”, citizens wondered whether a poor harvest was in prospect or whether the campaign was merely part of the government’s efforts to eradicate petty crime and instill greater discipline.

The whole of September 1963 was marked by an air of panic. During the first weeks, rumors about very poor harvests spread throughout the USSR. The population, especially those who kept animals, responded by buying up bread. A panic began. There were long lines in shops and some products were left in short supply. The products most in demand among the population included not only bread but sugar, salt, tobacco, canned foods, and matches.

It is very difficult to say exactly where and when the panic started (*New York Times*, 1963). Most likely it started in the Ukraine as early as the end of August. In the central party paper *Pravda* correspondents reported seeing suburban residents of the Ukrainian city of Kharkov carrying up to 25 loaves to their homes to feed to livestock and poultry. “Some officials boast that they over-fulfilled the August sales plan by 5 percent.” The paper explained that owners of private livestock found it simpler and cheaper to feed bakery bread to their animals than to try to obtain grain through official channels.

The panic then spread to Moscow, Siberian cities, the Baltic republics, the Caucasus, and Central Asia. By mid-September, restrictions on the sale of bread had been imposed in Moscow stores and in many parts of the country peasants were buying up bread and grain cereals to feed their cattle. The retail sale of wheat flour had been completely discontinued. At the same time, housewives, apparently in preparation for a hard winter caused by a mediocre harvest, were stocking up

on cereals, macaroni, sugar, canned meat, and sardines. It was reported that sales to individual customers in some of Moscow's shops were confined to one loaf of white bread and half a loaf of black bread. The Soviet press reported grave abuses in the sale of bread to professional speculators and owners of cattle, pigs, and poultry for non-personal consumption (United Press International, 1963).

Trud, the Soviet trade union newspaper, reported that "from Gorki, Moscow, and Rostov we have word that long-established rules for the sale of bread to individuals are being disregarded. This is exploited by all kinds of profiteers, who use bread as fodder for their cattle and poultry." There were similar reports from areas as far apart as Kungur in the mid-Urals and Alma-Ata (now Almaty), the then capital of the Central Asian Republic of Kazakhstan, in the heart of the vast "virgin lands" agricultural countryside that had a particularly bad harvest that year (United Press International, 1963). For example, in Alma-Ata, rumors caused long bread queues to build up in front of a bakery. "People have decided to stock up, just in case", the newspaper *Kazakhstanskaya Pravda* reported on its front page (*New York Times*, 1963).

The Soviet authorities had tried to prevent the panic by announcing the purchase of foreign grain supplies. On 17 September, Radio Moscow (1963) reported that a protocol had been signed in Ottawa which extended the trade agreement between the USSR and Canada for a three-year period. Then Khrushchev announced the purchase of foreign grain in his speech in Krasnodar on 26 September. His speech was published in the papers on 2 October. Khrushchev blamed adverse weather for the difficult agricultural position of the USSR. He also assured people that bread reserves would be sufficient if people economized on their consumption. The report in *Izvestia* (the Soviet press did not usually carry reports of this kind) said that the first shipload of Canadian wheat had just been unloaded in Odessa, and that two more ships were expected in the next two days. The publication of such news was clearly intended to stop both the hoarding of food and the slaughtering of cattle (*Guardian*, 1963). However, the population did not trust the words of the Soviet leader and local authorities tried to buy food elsewhere, even in the most distant areas. In the middle of October the panic became unusually widespread and covered the entire country (Mondich, 1963).

The panic slaughtering of cattle then reached its peak. A British newspaper pictured lines of lorries filled with cattle waiting in front of

slaughterhouses in the Kursk area. The lorries had come from collective farms trying to get rid of the cattle, according to the paper. It quoted farmers as saying that they did not have a single potato to feed to their pigs. The paper confessed that serious apprehension was being caused by farmers who were sending cattle to the slaughterhouses prematurely, even though they had enough fodder (*Guardian*, 1963).

The food crisis of 1963 should have been the turning point for the Soviet authorities in relation to its policy towards farmers. Although grain imports brought some relief to the situation, the personal political losses for Nikita Khrushchev were colossal. At the XXIst Party Congress (in 1959) he announced that the country was beginning to “construct Communism”. Four years later, in 1963, the population of Soviet cities were consuming bread made from very low-quality flour, while high-quality bread was produced only for medical and children’s institutions, and, of course, the party elite. As for the rural populations, the most important thing was the kind of policy for food procurement that was being used. In 1954, announcing the start of the virgin land campaign, Nikita Khrushchev promised Soviet peasants that only the marketable share of grain would be procured by the state, but no real change occurred. As in the 1930s, the regions suffering most from food shortages were the productive ones. The food crisis of 1962 started in Novocherkassk, which is located in a productive region with good agricultural potential. Moreover, the Rostov province fulfilled its plan for agricultural production and even produced more than the planned target that year (*Daily Telegraph*, 1962). Why should this region have faced a food shortage in 1962?

Soviet farmers could ask the same question in the following year, 1963. Stavropolsky krai delivered 2.7 million tons, 0.7 million tons over the plan target. This amount of grain amounted to 59 percent of the harvest and had never before been delivered by the krai (*Selskaya Zhizn*, 1963). The size of the grain procurement in Krasnodarsky krai was 3.2 million tons. This amount was again 0.9 million tons higher than the average figure (*Pravda*, 1963). Despite the over-fulfillment of target plans, the local population had to spend many hours in queues for low-quality bread. The food shortage had already become not just a problem of physiological survival but a political question raised by peasants who worked hard but did not receive relevant compensation in terms of food supply.

Table 7.9.3. Grain production and procurement (millions of tons) in terms of per capita supply of grain (kg) in the RSFSR in the 1960s

RSFSR	Average	1960	1961	1962	1963	1964	1965
Grain production	87.4	76.2	73.7	86.8	65.8	87.0	69.7
Grain delivery	35.1	29.5	30.5	36.3	28.0	38.9	21.8
Grain remainder	52.3	46.7	43.1	50.4	37.8	48.0	47.8
Per capita	0.5	0.44	0.42	0.5	0.38	0.5	0.4
In urban areas	0.3	0.25	0.26	0.3	0.24	0.33	0.18
In rural areas	0.9	0.8	0.77	0.9	0.68	0.86	0.85

Source: *Selskoe khozyastvo v SSSR v 1970, 1971*.

In 1964, despite a good harvest, the gross agricultural production per capita was lower than in 1958 (*State of Soviet Agriculture*, 1964). In 1964, the meat shortage was to be serious because meat production fell by 24 percent after the record slaughtering of Soviet herds in the previous year. The worst crop failure in the virgin lands area made 1965 again problematic. However, no reports of acute food crises emerged in that year. Imports of food can provide only a partial explanation of the easier situation in the USSR in 1965.

Here we suggest a very important shift in Soviet policy in relation to farmers, who still comprised a large proportion of the Soviet population. Perhaps at that time the Soviet authorities came (without much publicity) to a final decision to abolish Stalin's practice of the expropriation of the non-marketable part of grain from farmers. The Soviet authorities must have realized that the social cost would be too high if food problems were again solved at the expense of the farmers. The new radical reform in agriculture came to a head.

This suggestion can be confirmed by an analysis of official Soviet statistics. One can notice remarkable differences in the ratio between grain procurement and grain remaining for 1963 and 1965. The harvest of 1963 was much lower than in 1965, but the amount of the grain procurement was significantly higher (Table 7.9.3.). The statistics show that the amount of grain available for the rural and urban population declined by the same percentage in 1963. This means that the decrease in the harvest was spread roughly evenly between the urban and rural populations, although the former was a consumer and the latter a producer. The situation in the next poor year was quite different. In 1965, the urban population already bore two-thirds of the losses and the rural

Table 7.9.4. Grain production and deliveries in the regions of the USSR between 1960 and 1965 (millions of tons)

Region	Parameter	Average	1960	1961	1962	1963	1964	1965
Central Black Earth	Production	8.9	6.1	8.6	9	5.3	9.4	8.6
	Procurement	3.3	1.8	3.4	3.3	1.9	3.6	3.1
	Remainder	5.7	4.3	5.1	5.7	3.3	5.8	5.5
Volga	Production	21.2	17	16.3	22.8	16.4	22.4	17
	Procurement	10	7.3	7.9	11.4	8	11.9	6.8
	Remainder	11.2	9.7	8.4	11.4	8.4	10.5	10.2
North Caucasus	Production	15.5	13.3	13.4	17	15.5	15.5	13
	Procurement	7	5.4	6.3	8.2	8.8	7.3	4.9
	Remainder	8.5	7.9	7.1	8.8	6.7	8.2	8.1
Urals	Production	12.3	12.1	9.5	12.1	9.2	11.2	7.5
	Procurement	5.5	5.2	3.9	5.7	4	5	2.1
	Remainder	6.7	6.8	5.6	6.4	5.2	6	5.4
Western Siberia	Production	11.8	14.5	12.8	10.2	4.9	13.5	6.5
	Procurement	4.9	7.1	5.6	3.5	0.6	7	1.3
	Remainder	6.9	7.4	7.2	6.7	4.3	7	5.2
Kazakhstan	Production	17	18.7	14.6	15.9	10.6	23.6	7.6
	Procurement	9.9	10.2	7.5	8.2	4.8	15	2.4
	Remainder	7.1	8.5	7.1	7.7	5.8	8.2	5.2
Ukraine	Production	30.5	21.8	34	28.7	21.9	30.4	31.6
	Procurement	10.6	5.9	12.9	10.7	9.7	11.5	10.3
	Remainder	19.9	15.9	21.1	18	12.3	18.9	21.3

Source: *Selskoe khozyastvo v SSSR v 1970, 1971*.

population one-third of the total losses. This marked a change of policy on the part of the authorities towards the Soviet farmers, who were allowed to keep as much grain as they needed.

An analysis of regional data shows that regions not affected by the drought of 1963, such as the North Caucasus, had to deliver significant amounts of grain, considerably above their normal quantity. In 1965, the North Caucasus again suffered from dry weather (the extent of crop failure was even greater than in 1963) and was allowed to keep the same amount of grain as in an average year. In 1965, non-affected regions (for example the Ukraine) were allowed to keep even larger grain reserves

than in an average year. The analysis indicates that after 1965, productive regions already had a certain advantage over non-productive regions in terms of grain supply (Table 7.9.4.).

7.4. Summary

No mass famine or malnutrition of a large proportion of the Soviet population existed at the start of the Khrushchev period. Food problems manifested themselves rather in social tension and dissatisfaction among the people at the interruption of the food supply. These food problems were the result of the growing imbalance between grain demand and grain requirements in the USSR in the course of the virgin lands campaign. When he proposed to start an ambitious livestock program in 1957, Nikita Khrushchev had miscalculated the prospects for grain production in the “virgin lands”. The new agricultural area could provide some surplus grain for the country, but not in sufficient and stable enough amounts to support the planned growth of the Soviet herd. Good years, in terms of weather, proved to be rare events while dry weather was common. Moreover, the ploughing of meadows and pastures in the course of the virgin lands campaign had caused a shortage of non-grain fodder for livestock. From the end of the 1950s, a shortage of animal feed was experienced throughout the country. Due to the chronic feed shortage the Soviet herd showed none of the planned growth, even in normal years, and when large droughts affected the country in the early 1960s, it resulted in the mass slaughtering of livestock because of the lack of fodder, as well as the panic hoarding of bread and other staples by the population in the USSR.

NOTES

- 1 According to the Soviet norm, the optimal consumption of pasture grass is 50 to 60 centners per head, that of coarse grass 30 centners per head, that of succulent fodder 40 to 50 centners per head, and that of concentrated grain 3 to 5 centners. We have used the following coefficient to recalculate these figures in terms of feed units (the equivalent of 1 kg of oats): for pasture grass 0.14; for coarse fodder 0.4; for succulent fodder 0.18; and for grain 0.98.

CHAPTER 8

The period of agricultural intensification (1965–1975)

The first five years of this period are widely recognized as the most fruitful in the post-war history of the USSR. The Soviet government rejected the kind of frenetic and voluntaristic methods of implementing economic reforms that had been seen in the Khrushchev era. The new leaderships under Brezhnev and Kosygin, being more technocratic, promised much less than Khrushchev. The goal for the construction of Communism was postponed until the distant future. Instead, the more modest goal of constructing “developed Socialism” was announced. The plan targets for five-year periods became more realistic. The Soviet Union planned to keep industrial growth at between 7 and 9 percent a year, while for agriculture the rate of annual growth was set at 4 percent. The authorities began to emphasize economic stimuli rather than administrative measures. An economic reform based on the ideas of some liberal-minded Soviet economists (Liberian) was proposed, to provide more incentives for enterprises. The technocratic approach brought some results especially in the early years. A positive move was also the wider recruitment of scientists and technical experts for the development and implementation of industrial projects in the USSR.

8.1. Major developments in agriculture

After ten years of costly and disappointing efforts to boost grain production through the development of the USSR’s vast “virgin land” areas, Soviet agricultural planners turned to the concept of “intensive cultivation”. As a result, things did get better between 1965 and 1975. Soviet grain harvests increased by 40 percent and agricultural labor productivity rose by 58 percent. Agricultural production per capita grew by 25 percent (*Narodnoe khozyastvo SSSR*, 1982). Importantly, this growth in grain production was achieved due to progress in productivity. Not

Table 8.1. Changes in crop areas in some economic regions of the Russian Federation, 1965–1970 (thousands of hectares)

Region	Total crop area		Change %	Cereal crop area		Change %	Fodder crop area		Change %
	1965	1970		1965	1970		1965	1970	
RSFSR	123,945	121,912	-2	77,594	72,689	-6	33,554	37,427	+12
Northwest	2,843	2,904	+2	957	934	-2	1,339	1,506	+12
Central	13,902	13,732	-1	7,087	6,690	-6	4,631	5,093	+10
Volga-Vyatka	6,577	6,542	0	4,315	3,916	-9	1,489	1,958	+31
Central Black Earth	10,992	10,964	0	6,022	5,685	-6	2,937	3,422	+17
Volga	27,858	27,697	0	19,149	18,223	-5	6,564	7,394	+13
North Caucasus	16,157	15,698	-3	9,066	8,473	-7	4,913	5,194	+6
Urals	16,165	15,878	-2	11,400	10,718	-6	4,011	4,478	+12
Western Siberia	18,938	17,757	-6	13,349	11,786	-12	4,740	5,201	+25
Eastern Siberia	7,623	7,629	0	5,031	4,969	-1	2,297	2,405	+5
Far East	2,492	2,713	+9	1,042	1,148	+10	432	551	+28

Source: *Narodnoe khozyastvo v RSFSR v 1987, 1988.*

only did the total crop area not change, it even decreased in some parts of the country (Table 8.1.).

The new agricultural policy was adopted after a week-long session of the Soviet Communist Party Central Committee in 1964. The plenum continued to play down the importance of the virgin lands experiment and called instead for maximum use of existing farmlands. The committee's official resolution declared: "We must solve the task of ensuring that the country's demands for grain and other products are met through a sharp increase in harvest yields and the intensification of agricultural production in every way possible." The plenum announced a target to transform agriculture from an inefficient, labor-intensive, mainly crop-producing sector to one which is efficient, capital-intensive, and multi-product, thereby reducing the instability of year-to-year production and providing reliable supplies of major farm products. In the livestock sector, the plenum suggested the transformation of Soviet livestock breeding into a highly industrialized and specialized branch.

The next plenum of the Central Committee of the CPSU (in March 1965) confirmed the new course and adopted the resolution “On urgent measures for the development of agriculture”, which called for the comprehensive intensification of Soviet agriculture. It was declared that the main emphasis should be on creating stable economic conditions in order to stimulate incentives for farmers. Fixed (for several years) plan targets for farm grain deliveries were promised. The resolution proposed the introduction of a bonus system for deliveries of agricultural products over the plan figures, as well as other stimuli.

The period between 1965 and 1975 is characterized by the unprecedented scale of financial support for Soviet agriculture. In the eighth five-year period (1966–1970) 82.2 billion rubles (105.4 billion dollars) were allocated, and in the ninth five-year period (1971–1975) the figure rose to 131.8 billion rubles (168.9 billion dollars). By way of comparison, during the seven-year plan period, 1959–1965, investment stood at 48.6 billion rubles (or 2.7 times lower). The proportion of agricultural investment in terms of overall state capital investment rose from 19.6 percent in the 1960 to 1965 period, to 23 percent between 1965 and 1970, and to 26 percent between 1970 and 1975. During this period the USSR invested the equivalent of two-thirds of all the money invested in agriculture prior to 1965 (Golikov, 1975).

The resources allocated to Soviet agriculture were massive even in comparison with Western countries. Parker (1972) notes that Soviet expenditure on agriculture expanded much more rapidly than the American, especially when allowance is made for monetary inflation in the USA. According to his data, in relation to total national investment, spending on agriculture in the USSR amounts to about 18 percent of the whole budget against a mere 5 percent in the USA (148). “There can be little doubt that Soviet agriculture is the most expensive in the world”, the author claims. Indeed, if the official dollar exchange rate (in the late 1960s one ruble cost about 1.27 dollars at official rates) is used, Soviet agriculture was even more heavily subsidized than American (Table 8.2.).

In the new agricultural policy of the USSR, major emphasis was given to fertilizer application. It is worth mentioning that it was Khrushchev who initiated the wide application of chemical fertilizers in the USSR. At the Plenum of the Central Committee of the CPSU in December 1963, following the wave of crop failures that year, Khrushchev proposed a grandiose program for the production of mineral fertilizers, herbicides, and other chemicals needed to increase agricultural production.

Table 8.2. Investment in agriculture in the USA and USSR, 1950–1969 (billions of dollars or rubles)

Year	United States, dollar	Soviet Union, ruble
1950	4.8	1.6
1960	4.6	4.9
1965	7.9	8.7
1969	9.4	11.9

Source: Parker, 1972.

The Soviet leader used all the power and propaganda of the state to promote the program. Lenin's injunction that "Communism is the Soviet system plus the electrification of the entire country" was altered to read "Communism is the Soviet system plus the electrification of the entire country, plus the chemicalization of agriculture" (Goldman, 1968). This program called for an expenditure of 104 billion rubles (133 billion dollars) for seven years for the expansion and modernization of the USSR's chemical industry in order to obtain the fertilizers. The Soviet leader said this was needed in order to make the USSR self-sufficient in agricultural production (Kiselev and Shagin, 1996). It was planned to supply the farms with 72 million tons of fertilizers by 1975, almost three times more than in 1965. The Soviet Union intended to increase production of phosphate and nitrogen fertilizers as well as artificial protein substitutes for feeding cattle. Western know-how was a crucial factor in the modernization of the chemical industry. The USSR wanted to buy 2 billion dollars' worth of machinery and equipment from the West to carry out the much-heralded buildup of its chemical-fertilizer industry.

Real figures on fertilizer production were even higher than planned. In 1965 the country produced 31.2 million tons of fertilizers, and in 1975, 90 million tons (*Narodnoe khozyastvo SSSR*, 1982). During this period in the USSR, mineral fertilizer applications had increased faster than in developed countries. Parker (1972) points out that, although fertilizer use in the United States had been pioneering and the Soviet Union had lagged behind, the great fertilizer drive instituted by Khrushchev enabled Russia to overtake America in the amount applied (Table 8.3.). However, the author admits that there remained a big gap between the American situation, with numerous varieties of well-packed high-grade fertilizer, and that existing in Russia, where the product was seldom properly stored or transported.

Table 8.3. Consumption of artificial fertilizers in the USA and USSR, 1950–1970 (millions of tons)

Year	United States	Soviet Union
1950	20	5
1960	24	11
1965	33	31
1970	38	55

Source: Parker, 1972.

There were also some improvements in agricultural practice in the steppe zone of the USSR. The exploitative nature of Khrushchev's style of farming (Stalin, by contrast, was an advocate of grasslands, as it proved to be a substitute for chemical fertilizer), with its emphasis on grain and corn growing at the expense of soil conservation practices, was rejected. The bitter lessons of the virgin lands proved to the Soviet authorities that grain crops depleted the soil and actually promoted soil erosion, while grassland farming was soil conserving. The measures undertaken by the Soviet authorities relied on the experience of Western farmers, mainly from Canada. In the 1960s, in the virgin lands of Kazakhstan and Western Siberia, average yields reached 7 to 8 centners per hectare, while in the steppe districts of Canada an average yield was 16.7 centners per hectare at that time (*Problemy sel'skogo khozyastva*, 1967).

Firstly, the practice of fallow-land crop rotation was re-established. The dogma "Fallow land is lost land; erosion is a fiction" proved to be completely false. In the spring of 1966, many farms "were urged to sow fallow areas and eroded plateau" (*Pravda*, 1966). It was heralded as a victory for the healthy, creative forces of the people over "voluntarism" ("Pravda dissatisfied with virgin lands harvest", 1966).

It was already generally agreed that, in order to preserve the organic structure and fertility of soils in semi-arid marginal grain lands such as those to be found in Kazakhstan, an appreciable share of ground had to be left fallow each year. Canadian farmers left between 20 and 40 percent of their spring grain lands fallow each year, and Soviet soil specialists also recommended a share of up to one-third. With the soil conditions found in most of the virgin lands, regular setting aside as fallow is the single most effective measure for long-term stable yields. It controls moisture losses, keeps down weeds, and safeguards against wind erosion ("Rape of the virgin lands...", 1969).

The head of the chief office for grain crop and general problems of the Ministry of Agriculture of the USSR published the article “The development of agriculture in the USSR” in the magazine *Economy of Agriculture* (*Ekonomika sel'skogo khozyastva*, 1967). He argued that improper farming practice in the virgin lands had resulted in the loss of some million hectares of arable land. “We had to sow these lands in northern Kazakhstan and Western Siberia with perennial grass. These lands should be used as hayfields and pasture.” The new area of land for grain was reduced steadily after 1964 by about six million hectares. Western specialists had long surmised that some of the grain lands would have to be taken out of production. Part of the reason may be due to the acceptance of the theory that about one-quarter of the land must lie fallow every year (“New statistics on the virgin lands...”, 1972).

Secondly, a new method of soil cultivation was introduced in the steppe zone. In previous decades, many enterprises had ploughed up not only fertile tracts of land but extensive areas which yielded readily to the plough because of its mechanical properties, but then quickly became eroded. This was the result of being ploughed too deeply, as had been done for a long time in the traditional farm districts located in forest steppes and forest zones. The Canadian wheat-farming methods used in the prairies were studied and tested in field trials for several years by the USSR at the Grain Research Institute in Shortandy, Tselinogradskaya region. It was shown that stable harvests of grain crops, and of spring wheat in particular, could be achieved in the virgin lands, but the system of deep ploughing had to be replaced by one in which the soil retained its stability, thus preventing erosion and facilitating snow retention. When the snow blanket is thick, the soil does not freeze deeply, it thaws more quickly in the spring and absorbs more of the melted snow. Soil in those fields in which the stubble is retained holds twice as much spring moisture as that broken up by moldboard ploughs.

Local scientists proved the need to cultivate two varieties of spring wheat, each with a different growing period, on all farms. This is an added guarantee against crop failure and helps to reduce the strain on labor resources during the spring and, later, harvesting. Working jointly with engineers, members of the Shortandy research center developed and tested a series of new farm machines. At the same time, they put the new cultivation methods into practice. After many years of experimentation, valuable results were obtained at large pilot enterprises belonging to the institute. Over a period of eight years, from 1957 to

1964, the spring wheat harvest, from an area of 25,000 hectares, averaged 0.5 tons per hectare more than on state farms throughout northern Kazakhstan. Approximately the same result was obtained on many farms where systems other than deep ploughing were used. The institute obtained very high yields of wheat and other crops in 1966. It was hoped that using the cultivation system developed in Shortandy would ensure a rapid increase in yields (of approximately 50 percent) in the virgin lands. The new methods of cultivation were recommended for implementation throughout all steppe regions of the USSR (*Moscow News*, 1966).

These measures played a positive role in combating wind erosion in the virgin lands, which allowed the Soviet Union to further exploit them for grain production, although yields in the virgin lands remained the lowest in the country. The Soviet authorities saw this main function as being a buffer region. The probability of a drought that would cover all three major grain-producing regions in the country—the Ukraine, the Northern Caucasus and northern Kazakhstan—was low.

For traditional agricultural regions a special complex program for combating erosion was elaborated by the Soviet government. In 1967, the CPSU Central Committee and the USSR Council of Ministers adopted a decision “On Urgent Measures against the Wind and Water Erosion of Soils”. As the Soviet press noted, the decision was very important and is part of a comprehensive series of undertakings aimed at improving farming standards. Practical measures for implementing the resolution were the planting of windbreaks; the planting of trees in gullies, along the banks of rivers and reservoirs, and in sandy soils; terracing; and the construction of ponds and other reservoirs. Plans made to produce large numbers of special machines and funds were allocated for this work. Already by 1968 to 1970, windbreaks were being planted over an area of 324,000 hectares (*Moscow News*, 1967). Many scientific institutes were recruited to elaborate measures for the prevention of soil erosion. However, one should not overestimate the efficiency of these measures, since we know that erosion remained a serious challenge for the Soviet agriculture. The failure of another program for land reclamation, raising of soil fertility and irrigation, announced by the Plenum of the Central Committee of the CPSU in May, 1966, is more conclusive. The major targets of these costly large-scale irrigation projects were to radically increase rice and cotton growing areas in Central Asia, southern Ukraine (Crimea), Kuban and Don valleys (North Caucasus). From the

Table 8.4. The profitability of agricultural production after 1965

Crop	As of 1960 (kolkhoz)	1967 kolkhoz	1967 sovkhov
Grain	155	184	116
Potatoes	147	153	106
Sugar beets	164	140	107
Sunflower seeds	—	589	407
Milk	86	98	87
Beef	65	109	87
Mutton and lamb	98	113	98
Pork	67	104	96
Eggs	65	83	108

Source: Nove, 1969.

mid-1970s, these areas would suffer from salinization and pollution of soil, while catastrophic reduction of river flow in the Aral and Azov seas became the major environmental problem for the USSR.

In the mid-1960s, the principal question for the further development of Soviet agriculture was still the distorted prices for agricultural products that resulted in most crops and animal products being sold at very low rates of profitability. Here again some positive steps were taken in the course of the agricultural reform.

New purchase prices for agricultural products were announced at the March 1965 plenum. Basic procurement prices for wheat and rye were raised by an average of 12 percent for most regions. Supplements of between 32 and 36 percent were added to the price of meat purchased from kolkhozes and sovkhovs (but not from private producers). The state purchase price for milk rose by about 20 percent (Bush, 1974).

The initial effect of the producer price increases was to make the production of most grains and most other crops very profitable. For instance, the average profitability of growing grain on kolkhozes in 1967 reached 184 percent, while most livestock products now returned a small profit in place of the former losses. There remained a wide and variable gap between costs and profitability in the public sector of Soviet agriculture. Taking costs in 1963 to 1965 as 100, the changes in the all-union average state purchase prices are shown in Table 8.4. This shows that in 1965 the changes did not eliminate the wide differences in profitability, although they did reduce them.

It is important to note that the price reform of 1965 dealt with one specific problem for Russia and stemmed from the gap in the cost of grain production in forest and steppes zones (mainly because of the different quality of soils). In Stalin's time (or until 1958, to be precise), two major strategies were applied to extract a differential form of rent: varying the scale of payments in kind for the service of the Machine Tractor Stations (MTSs); and varying the quota for compulsory deliveries of produce at low prices (Nove, 1969). In the course of Khrushchev's price reforms, the natural disadvantages were to be corrected by varying the state purchase price from area to area. However, the cost variations remained very great. For example, the production cost of cereals in the USSR was 48 rubles per ton, while in Krasnodarsky krai (North Caucasus) the cost was only 19 rubles per ton; in Belarus the cost reached as much as 140 rubles (*Pravda*, 1963). The price reform of 1965 improved matters in one respect, in that the zonal differences in prices were increased considerably. Thus in the Northern Caucasus wheat prices were increased by 13 percent, while in the non-black belt the increase exceeded 50 percent (Nove, 1969).

The price reform also had an impact on the livestock sector. Following the 1965 reforms, most livestock products returned a small profit in place of the former losses. Labor costs rose quickly with the introduction of guaranteed pay and higher earnings for kolkhozniks and with increased wages for sovkhoz workers and employees. The growth in average earnings outstripped that of productivity, and this had the greatest impact, understandably, on the labor-intensive livestock sector. As a result, by 1969 the average profitability of livestock production on kolkhozes and sovkhozes had fallen to a negligible amount. The large and growing discrepancy in the profitability of crop and livestock products inevitably manifested itself in the structure of output and sales. Bearing in mind that it was 50 percent more profitable to sell grain to the state than to feed it to the pigs, it is hardly surprising that the output of pork in the public sector first stabilized, then fell, despite a growing demand (Bush, 1974).

The Soviet authorities reacted to the situation by announcing new changes in purchase prices during the period 1967 to 1969, and then in the first half of the 1970s. The revisions concerned grain and livestock production, although again bringing some advantage to the crop sector. For example, a very good bonus was proposed for above-plan grain production. The purchase prices paid for crops ensured high to very high

profitability rates at current production costs for virtually all farmers, except in a few marginal regions (in the forest zone). Animal products had already brought a profit to practically all farms and regions, although in most cases the profit was not as high as the 45 to 50 percent deemed necessary by many specialists in order to ensure extended reproduction and high rates of planned growth (Bush, 1974). Official Soviet statistics show that in the early 1970s, the average profitability of beef production had already reached 21 percent and that of pork 30 percent, but milk production realized only 1.6 percent profit (Makarets and Makarets, 2002). In general, by the mid-1970s, after all the price revisions, most producer prices already promised a profit for each farm but rates of profitability varied from zero (for milk production) to over 300 percent (for sunflower seeds, for example).

The continuing large discrepancy between the profits to be obtained from selling grain to the state and those gained from feeding it to livestock suggested that farms would persist in choosing the former course unless ordered to do otherwise. Even specialized livestock farms reportedly grew grain in order to sell some at above-plan rates. Also, no seasonal price differentiation had apparently been provided, although, as was pointed out, this led to an overloading of the slaughter and processing facilities in the autumn and their under-utilization in the spring (Bush, 1974). To raise the profitability of the livestock sector the authorities probably relied on the implementation of a new, modern policy of the industrialization of livestock breeding through the construction of specialized, large-scale breeding complexes. These complexes were meant to bring a solution to the problem in the near future due to radical increases in productivity. Unfortunately, these hopes were never realized.

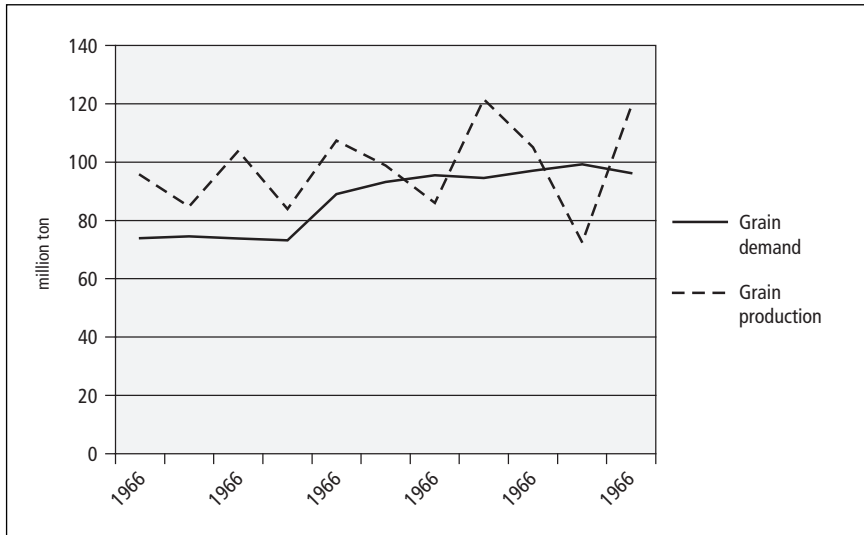
It is worth stressing that financial and material support from the state had brought a considerable improvement in the social climate of the Russian village. The reform of 1965 had important social aspects. On 1 July 1966, the Soviet government introduced monthly wages for kolkhozniks. Unlike in the Stalin and Khrushchev eras, when collective farms bore all the financial, administrative, and criminal responsibilities for failure of their activities, the state now covered the losses of farms and took responsibility for supplying farms with machines, fertilizers, seeds, storage facilities, etc. Thus the collective farms were gradually being turned into state farms (Goldman, 1968). Although the system that gave the state exclusive rights to plan agricultural activities for each of the millions of collective farms remained in force, there were some

changes. The most important improvement was that, after 1965, *kolkhozes* introduced the principle of having a firm plan for grain deliveries for some years ahead. This allowed for the delivery to the state of only the marketable part of the harvest, and for the rest to be retained for their own needs. Among other actions taken was the decision to lift some of the restrictions regulating the use of the peasants' private plots. Realizing that produce from the private plots was an important means of improving consumption for the urban sector, the state actually encouraged peasants to bring more to market.

On the other hand, agriculture had become more and more state dependent. The investments, both direct and indirect, were huge. Although purchase prices had grown radically, state retail prices for all staple foodstuffs were left unchanged. This necessitated a large and growing annual subsidy, as was seen, in particular, on meat. Holding meat prices constant at the retail level set by Khrushchev in 1962 cost the Brezhnev regime about 12 billion rubles in 1975. The total subsidy bill for agricultural products in 1975 was an estimated 17.2 billion rubles, equal to 15 percent of annual retail food purchases (Severin and Carey, 1978). At the same time, the prices of specifically agricultural goods such as farm tractors, grain combines, and fertilizers, were deliberately left unchanged.

Moreover, during this period the Soviet Union became one of the largest food importers in the world. In 1975, the year of the worst drought, the USSR ranked as the world's fifth-largest importer of agricultural commodities. Agricultural products in that year accounted for 25 percent of total USSR imports. Almost all the imported grain came from hard-currency countries. Raw sugar, traditionally from Cuba, accounted for one-quarter of the total value of agricultural imports in 1975. When poor sugar beet crops coincided with low Cuban cane crops, Moscow also purchased substantial quantities of raw sugar from other countries, such as Brazil, Australia, and the Philippines. Meat imports reached record levels in 1974 and 1975, partly reflecting the program to improve nutrition but also in response to the wide availability of meat on world markets and favorable prices. The bulk of this trade consisted in frozen meat—mostly beef, mutton, and poultry. In 1966, this amounted to 120,000 tons, to between 50,000 and 60,000 tons in 1967 and 1968, to between 70,000 and 80,000 tons in 1969, to around 220,000 tons in 1971, to over 500,000 tons in 1974 and 1975, and to between 350,000 and 360,000 tons in 1976. Although the Soviet Union exported some

Figure 8.1. Estimated grain balance of the RSFSR, 1965–1975



Source: *Sel'skoe khozyastvo v Rossii*, 2000.

agricultural products (cotton, sunflower oil, even canned meat), the international agricultural commodity trade became a serious drain on the country's balance of payments, particularly with hard-currency countries. In the 1970s, the agricultural trade deficit with hard-currency countries was at least half of the total Soviet hard-currency deficit (*ibid.*). The large food imports of the Soviet Union were becoming a factor in international policy, as poor harvests meant a less aggressive foreign policy from the Kremlin. According to the once popular saying: "If Russia has a good harvest, its foreign policy will be bold and aggressive" (*Christian Science Monitor*, 1970).

Here we see the major indication of the failure of the agricultural policy of the USSR in 1965 to 1975. Despite considerable growth in agricultural production, the country had to import growing amounts of grain and other staple foods (see Table 8.9.4.). The main cause of this situation was an imbalance between the grain and livestock sectors, as in the early 1960s. In an effort to meet the growing standards of food consumption among the Soviet people, the USSR launched a shift to a livestock economy through modernization and industrialization. Such a shift sharply escalated the demand for feed grain and caused the USSR to enter international grain markets as a major importer. It might be

Table 8.5. Grain production and estimation of the basic grain requirement in the RSFSR (millions of tons)

Indicators	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Grain feed demand	32.9	33.5	32.8	32.2	48	52.2	54.5	53.5	55	57.2	54.2
Food grain demand	25	25	25	26	26	26	26	26	27	27	27
Seed grain demand	16	16	16	15	15	15	15	15	15	15	15
Summary demand	74	75	73.8	73.2	89	93.2	96	95	97	99.2	96.2
Grain production	96	85	103.8	84	107	98.8	86	122	105.1	72.4	119

Source: calculated on the basis of *Sel'skoe khozyastvo v Rossii*, 2000.

suggested that the Soviet Union deliberately admitted some imbalance, hoping to straighten out the situation in the near future when the modernized livestock breeding sector became more productive. Grain imports were regarded as only a temporary measure during the period in which the livestock sector was being reorganized.

As it was, the share of grain fed to livestock reached 47 percent of the average production (162.7 million tons) between 1965 and 1970, and in the next five years the proportion rose to 64 percent, even though average grain production also grew to 181.6 million tons. Figure 8.1. presents our estimations of grain demand (including food, feed, and seed requirements) for the Russian Federation between 1965 and 1975. For our estimation of the grain demand for feeding animals we use the following parameters: for feed grain 5 centners per standard unit for 1966 to 1968, and 7.3 centners per head for 1970 to 1976. Our estimates of the feed grain demand are confirmed by figures issued by M. S. Solomentsev, chairman of the RSFSR Council of Ministers, who stated that the average volume of feed grain consumed on the kolkhozes and sovkhozes of the Russian Federation was 33.2 million tons between 1966 and 1970, and 51 million tons during 1971 to 1973, with a planned 55 million tons for 1974 (Bryan, 1973). The size of the Soviet herd, measured in standard units, is estimated on the basis of a pig equaling 0.6 of the weight of cattle. The state also estimated a norm of two centners per hectare for seed grain, and a food demand of roughly 0.2 tons per capita per annum (Bryan, 1971) (Table 8.5.).

Figure 8.1. shows that the basic demand for grain (without taking into account the demand for industry, the state reserve, and exports to ally countries) increased too rapidly in comparison with grain production. Between 1966 and 1970, grain demand in the Russian Federation was estimated to have grown by 24 percent, and grain production by only about 9 percent. As a result, by 1970 grain demand had approached the average figure for grain production in the republic.

This overstretched grain balance suggests great instability for a country with a capricious climate. Already in 1971, although there was an average harvest that year, the USSR had to purchase 2.9 million tons of animal feed (corn, barley, oats) from the United States. Western experts reasonably concluded that it meant that the Soviet Union would become a net grain importer in the near future. Indeed, in December 1971, the Soviet minister of agriculture announced to United States officials during his tour of US farm states what he called a “long-term” need for corn and other feed grains in the Soviet Union, which he put in the framework of about “five or ten years” (Bryan, 1971). Thus from 1971, the Soviet leadership relied on imports of feed grain to support the livestock program. These grain imports reached a peak in 1972 and 1975, when severe droughts occurred.

The growth in grain demand between 1965 and 1975 was associated with a new policy for developing the Soviet livestock breeding sector. This policy started in 1968, when the October Plenum of the Central Committee of the CPSU urged for the complete industrialization of livestock breeding during the following three to four years. The plenum also moved for the development of a specialized meat production branch in the livestock sector (the majority of communal cattle were of a dual purpose variety, in which productivity is generally very low). In 1968, the livestock sector received equipment worth a total of 377 million rubles. This figure was three times more than that in 1966 (*Pravda*, 1969b).

The move was accelerated in 1970. The July Plenum of 1970 again demanded that the livestock sector develop in the form of large industrial complexes. This approach meant the full mechanization of all operations as well as the production of meat, milk, and eggs all year round. This was designed to lower production costs for livestock produce. The Central Committee of the CPSU announced a plan to construct 1,170 large state industrialized livestock complexes and to build or enlarge 585 poultry enterprises in the USSR (*Pravda*, 1971). It decreed that the construction of such large complexes should take no longer than three

years. It also said that state complexes with a capacity of between 12,000 and 24,000 pigs and between 800 and 1,200 cows should supply their own feed. It was reported that the construction of such large complexes had already begun in Belgorod, Tambov (Central Black Earth region), Kharkov (Ukraine), and Grodno (Belarus) provinces, and Moldova. In the Ukraine, 514 large industrialized livestock complexes (for cattle and pigs) and 274 poultry complexes were under construction (*Pravda*, 1971b). In the eighth five-year plan period (1966–1970) the state gave out 2.5 billion rubles annually for the construction and equipment of the large complexes, and 5 billion in the ninth five-year plan period (*Trud*, 1979).

In November 1970, *Pravda* reported that industrialization had been achieved in the majority of sovkhoses. The largest pig-breeding complexes were under construction in Moscow and Gor'ky provinces. Their capacity was planned to be 108,000 head a year. One such complex would deliver 3,000 pigs to slaughterhouses a day. It was planned to complete the construction by 7 November 1971 (the anniversary of the Socialist Revolution of 1917) (*Pravda*, 1970c). It was calculated that the expenditure on the construction of such a complex could be covered in two to three years. *Pravda* stressed that the normal functioning of such large complexes would be achieved if the production of mixed feed as well as fish and bone meal was arranged.

Feed resources were the key problem in the implementation of the ambitious program of the modernization of the Soviet livestock sector. At the plenum of the Central Committee of the CPSU in July 1970, Brezhnev claimed that the “most important thing for progress in the livestock sector is feed, feed, and once more feed” (this expression was meant to remind Soviet people of the famous response given by Lenin to the question “What is the main task of a young Communist”: “To learn, learn, and once more learn”) (*Pravda*, 1970b). The Central Committee of the CPSU adopted the resolution “On measures to increase and improve fodder resources” (*Pravda*, 1970c). It was planned that large complexes located in the suburbs of major cities would be based on industrial supply techniques with concentrated feed. A complex feeding 108,000 head would need 25,000 hectares of agricultural land, but such acreage was not available in most regions of the country (*Pravda*, 1976a). The reliable transportation of the feed to the complexes became a major issue for the normal functioning of these complexes. Every large complex was to have its own facilities for the pro-

duction of mixed feed. As for smaller complexes, they would be constructed in areas where fodder resources were available. The availability of concentrated and other feed was the key factor when making a choice about the size and location of a complex.

At the beginning of the 1970s, the Soviet media carried many reports about the construction of livestock complexes in different regions, many accompanied by complaints about a shortage of fodder. Andreev, a member of the Agricultural Academy of the USSR (VASKhNIL), said that although the plenum in July 1970 had claimed that new livestock complexes should be working, as a rule, using their own fodder, no relevant measures had been adopted to create this fodder base for the large complexes. For example, one milk farm in the Moscow province with a capacity of 2,000 milking cows, which was supposed to supply its own feed, had only achieved 57 percent of what was required. In Leningrad province, large milk farms were able to produce only 50 to 60 percent of their own feed, with the remaining 50 percent having to be transported from outside. In many areas where industrialized milk plants had been constructed with a capacity of 1,000 cows, no “cultured” (improved) pasture had been planned. In Tomsk province (Western Siberia), the industrial production of milk was based on an all-year-round stall regime and there were no improved grasslands at all. Although Siberia was well known for its abundance of grassland, an increase in the fodder crop area and the transportation by truck of huge amounts of green feed were planned for supplying the new livestock complexes (*Pravda*, 1970f).

It is likely that the Soviet authorities, when faced with the problem of fodder shortage, sanctioned the allocation of excessive amounts of feed grain for the livestock sector from state reserves. *Sovetskaya Rossiya* reported that kolkhozes and sovkhoses had been allowed to increase the consumption of feed grain by 35 percent (1970a). Soviet statistics show that the rate of annual growth in grain consumption for the livestock sector was about 7 percent between 1965 and 1967, and 13 percent between 1968 and 1969. Between 1965 and 1967, the average consumption of concentrated feed was 5.5 to 5.7 centners per head (standard livestock unit), which then jumped to 8.0 centners per head. Correspondingly, the feed grain demand rose dramatically in 1969–1970 (Table 8.5.).

The growing consumption of feed grain in the USSR was associated with the poor state of other available feed. The yearly Soviet norm for feed units per head of livestock was 30 to 35 centners (*Ekonomika*

Table 8.6. Feed consumption in the Russian Federation (millions of tons)

Fodder	1965	1970	1971	1972	1973	1974	1975
Pasture grass	207.5	207.4	209.2	202.4	207.8	203.6	195.5
Coarse	89.3	91.5	97.5	107.9	105.9	116.1	120.8
Hay	44.1	45.0	45.4	43.3	40.6	40.4	41.2
Succulent	189.2	198.3	208.3	193.6	215.3	245.4	222.4
Incl. Silage	95.4	89.8	90.5	87.1	87.1	109.5	97.3
Concentrated	35.2	56.8	60.8	60.4	63.9	71.4	64.8
Total (feed units)	142.9	164.7	173.3	170.2	178.2	192.1	181.9
Feed per head (feed units)	22.9	24.7	24.6	24.0	24.8	25.9	24.5

Source: *Narodnoe khozyastvo RSFSR*, various years.

sel'skogo khozyastva, 1972). The shortage of feed reached 20 to 30 percent throughout the whole period (Table 8.6.). To meet the targets announced at the July Plenum of the CPSU in 1970, the increase in fodder supply needed to reach 50 to 70 percent by 1975 (*Izvestia*, 1970a). The actual increase was only between 12 and 16 percent. This growth was achieved due to an increase in feed grain. Feed grain was the single exception in relation to the plan fulfillment. The production of concentrated feed was planned to reach 125 to 128 million tons by the end of the five-year period, and in 1974 a total of 128 million tons were produced (although the figure then fell because of a severe drought) (*Sovetskaya Rossiya*, 1972). There was also some growth, although modest in terms of feed unit, in the succulent fodder available for livestock due to an increase in the sowing area under fodder crops.

The major failure was in the production of pasturage and hay. From 1965 to 1975, the amount of green grass and hay had decreased even in absolute figures (Table 8.6.). The North Caucasus, the main grain-growing region, was very problematic in this respect. In Krasnodarsky krai, because of the lack of grassland, livestock had to be kept in stalls all year round. Farmers had to supply wheat for feeding purposes. Green feed had to be cultivated and then transported to farms from other districts at great expense. Yields of hay differed enormously: in some areas 50 centners per hectare were obtained, but in others less than 2 centners per hectare (*Komsomolskaya Pravda*, 1969b). The same poor state of pastureland was reported from other provinces of the North Caucasus, including Dagestan, Stavropol, Astrkhan, and Rostov oblast (*Pravda*,

1970d). The main pasturelands were located in Kalmykia, and all other provinces used them for winter grazing. However, the deterioration of the pastureland could already be seen. In order to restore the winter pastures, they had to be left fallow from 1 April to 15 October, but in 1969, for example, there were 472,000 sheep and 7,000 cattle grazing on these lands in the summer. The number of sheep overwintering on the lands had been continually on the increase from 1960. This meant a demand not only for more productive pastureland but also for great reserves of hay, which was already transported from distant districts (*Sovetskaya Rossia*, 1970c).

Another problematic region was the Volga basin. In some provinces the share of arable land reached more than 80 percent of the total area, which faced extreme shortages of hayfields and pasture. The yield from these grasslands was very low—even in good years it did not exceed 4.1 to 4.4 centners of hay per hectare, resulting in unsatisfactory feed rations for the local livestock. The herds did not receive hay at all, the main coarse feed was straw. Vitamins and proteins were in short supply in their feed rations (*Sovetskaya Rossia*, 1971b).

The productivity of natural grasslands remained very low because of their poor condition. Official statistics show that in 1969 the total area of hayfield and pasture in the Russian Federation alone reached more than 84 million hectares, but the radical improvements planned were for an increase of 311,000 hectares. Only 19,000 hectares of grassland was irrigated in the USSR (*Komsomolskaya Pravda*, 1969b). According to the annual plan for 1970, there was to be a radical improvement of 1.668 million hectares of grassland, but only 20 percent of the plan was fulfilled. *Pravda* named Volgograd, Lipetsk, Kemerovo, Novosibirsk, and Omsk provinces, where not one hectare had been improved during the first half of the year (*Pravda*, 1970c). A land improvement plan for the five years between 1971 and 1975, including the irrigation of pasturelands, was very ambitious. All in all, more than 8 million hectares of pasture and grasslands needed to be “radically improved” (*Izvestia*, 1970a). However, there were no indications of any improvements as compared with 1966 to 1970, in relation to the melioration of grasslands.

The lack of storage capacity qualified as an important problem requiring government resources to bring about improvements. At the beginning of 1971, there were still only 123,000 silos with a maximum capacity of 22 to 23 million tons of processed silage (moisture and waste removed). In fact, the amount of silage and cured hay produced in the

USSR was 160 million metric tons. Therefore, a deplorable 85 percent of the country's silage was inefficiently stored (*Ekonomika sel'skogo khozyastva*, 1971). Much of this extra silage was simply piled by the roadside or put into barns and sheds, where it soon rotted. Almost one-third of state-procured silage was estimated as being spoiled the previous year and more than half of its feed value was lost.

Besides poor development in terms of fodder varieties, there were some specific reasons for the excessive waste of feed grain in the USSR. Most feed grain was still consumed in an unprepared ("unbalanced") way. Soviet planners hoped to improve the situation by expanding the mixed-feed industry. The interrelationship between mixed feed, productivity, and the profitability of the livestock sector had been widely publicized by the Soviet press. The year 1965 can be considered as the beginning of the operation of the Soviet mixed-feed industry. In that year, 15.2 million tons were produced by Soviet feed plants. In 1969, the figure was 21 million tons. This meant that only 26 percent of feed grains was delivered in the most digestible form. By 1975 it was planned to increase the share of mixed feed to between 45 and 55 percent of the total feed grain amount (*Pravda*, 1971a). This remained out of reach. Although the rate of growth in the mixed-feed industry was remarkable, the share of mixed feed reached less than 35 percent (about 40 million tons) of the total amount of grain consumed by Soviet livestock in 1975 (*Foreign Agricultural Circular*, 1979).

In general, the development of the livestock breeding sector (as for the whole of agriculture) in the USSR between 1965 and 1975 is rather controversial. There were some positive changes due to an increase in the amount of feed grain available and the provision of some economic stimuli for farmers. Official statistics show the considerable growth of the livestock sector, including a 50 percent increase in meat production and a 25 percent increase in milk production (Table 8.7.). The ninth five-year plan period envisaged that between 1971 and 1975, average meat production was over 14 million tons and average milk production 92 million tons (*Materialy XXIV c'ezda KPSS*, 1971). For the first time in the history of the USSR, meat and milk production, even if it did not meet the plan targets, came close to them. It should be borne in mind that the plan targets for 1971 to 1975 were unusually modest. The realistic character of the plan targets was particularly stressed by Leonid Brezhnev in his speech at the XXIVth Congress of the CPSU. Average meat production, at 14 million tons, would give only 54 kilograms per

capita, while the Soviet norm for meat consumption was estimated at 82 kilograms per capita. The statistics also indicate that the growth in meat production was achieved to a large extent as a result of the growth in livestock productivity.

On the other hand, the livestock sector was still characterized by very low productivity. Annually in the RSFSR about 9 million heads were slaughtered, with an average carcass weight of only 300 kilograms (compared with 370 to 380 kilograms produced on some advanced farms). Many farms delivered pigs with a very low weight of between 70 and 80 kilograms (compared with the 100 to 105 kilograms produced by some advanced farms). As for milk production, about 2,250 kolkhozes and sovkhoses of the RSFSR, or 10 percent of the total number, produced less than 1,700 kilograms per cow per year, while between 3,000 and 3,200 kilograms per cow were needed in order to provide the farmers with any profit (*Sovetskaya Rossia*, 1973). The major reason was the paucity of the (green) diet of Soviet livestock.

The same statistics indicate the unstable character of the development of the sector during the decade. There were years of decline in livestock numbers (1967–1969, 1973, 1976), in meat (1973, 1976), and milk production (1969, 1972, 1975, 1976). Although the direct reasons for these decreases were different they were all associated in some way with a new policy to create large industrialized and specialized livestock complexes. For example, in 1967 and 1968 the number of pigs decreased to only 50.8 million. This happened after a record year, 1966, when fodder reserves were higher than in any previous year. The reason for the recession was associated with a move towards the enlargement and specialization of the livestock sector, in the course of which small pig-breeding farms were liquidated in many kolkhozes. Other recessions (in 1969, 1972, and 1975) were associated with an acute fodder shortage caused by unfavorable weather conditions.

The most successful story was in the poultry production sector between 1965 and 1975. Poultry keeping was the first livestock branch developed on an industrialized basis after a special decision was adopted by the Central Committee of the CPSU in 1964. The modernization of the branch was carried out on the basis of the UK experience. During the first four years the number of such poultry complexes increased fourfold. Specialization was well developed in the poultry sector, and already in 1973 about 90 percent of eggs were produced in large poultry units (*Sovetskaya Rossia*, 1973). Egg production was the sole branch

Table 8.7. The main parameters of the development of the livestock sector in the USSR, 1965–1976

Year	Livestock inventory			Livestock production			Feed supply		
	Number of cattle (millions)	Pigs (millions)	Sheep and goats (millions)	Poultry (millions)	Meat (millions of tons)	Milk (millions of tons)	Feed per head (centners)	Concentrated feed (millions of tons)	Total feed (in oat equivalent) (millions of tons)
1965	87.2	52.8	130.7	456.2	10	72.6	22.5	65.3	278.5
1966	93.4	59.6	135.3	490.7	10.7	76	22.6	70.5	289.3
1967	97.1	58	141	516.4	11.5	79.9	22.9	75.1	295
1968	97	51	144	528	12	82.3	24	80	303.1
1969	96	49	146.1	547	12	81.5	24	90	307.2
1970	95	56	135.8	590.3	12.3	83	25	103	328.2
1971	99	68	143.4	652.7	13.3	83.2	25	110	344.5
1972	102	71	145.4	687	14	83.2	25	110	344.1
1973	104	67	144.7	700	14	88.3	26	117	366.2
1974	106	70	148.5	748	15	91.8	26	128	387
1975	109	72	151.2	792	15	90.8	25	119	368.5
1976	111	58	147.1	734	14	89.7	26	117	365
1977	110	63	139.8	796	15	94.9	27	143	403

Sources: Severin, 1984.

of the livestock sector in which costs of production decreased during the period. By 1975, poultry meat and egg production reached the planned targets (1.5 million tons and 50 billion units), but poultry meat represented only 10 percent of the total output of meat production in 1975.

8.2. Weather variations and agricultural production

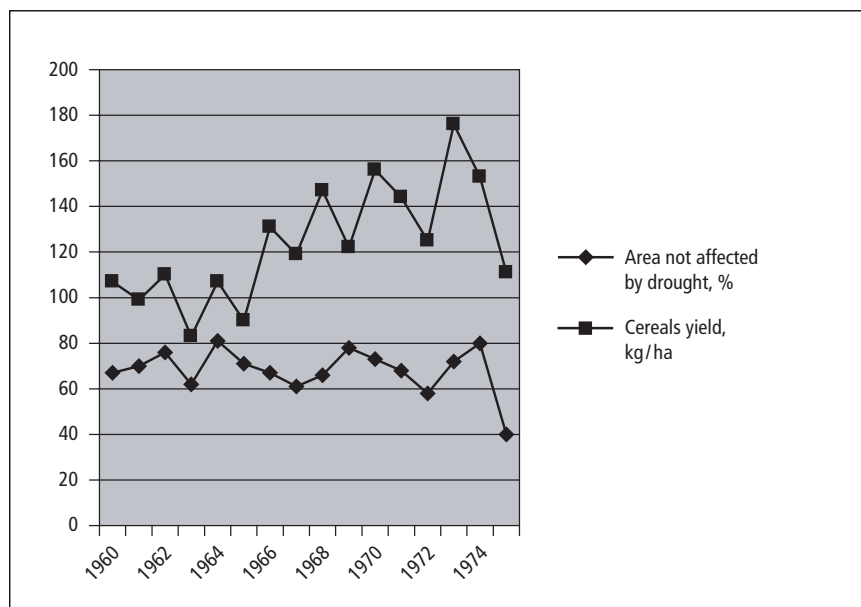
The role of climate in the performance of Soviet agriculture during the decade is critical. If an increase in grain production was achieved despite poor weather, then Soviet agricultural policy may deserve a more positive evaluation than we granted it above. In the 1970s, some Western experts discussed this question in connection with the prospects for the development of Soviet agriculture in the late 1970s and early 1980s. For example, Severin and Carey (1978) believed that a considerable part of the gains made over 1965 to 1975 were the result of unusually favorable weather but that this trend would not continue and Soviet agriculture would inevitably find itself in a recession period in the next decade. These experts also referred to a CIA report that argued that weather

was a key determinant of agricultural success and that over 50 percent of the increase in grain production between 1962 and 1974 had been the result of improved climate (“USSR: the impact of recent climate change”, 1976). The CIA report said that a comparison of the climate since 1960 with the long-term average showed that the stable period of increased moisture in the late 1960s and early 1970s in the steppe and near-desert regions was unusual. It also indicated that a steady improvement of the climate in the grain-growing region, increased precipitation, warmer winters, and cooler summers, had occurred between 1960 and 1970 but that continued improvement was unlikely. The drought of 1975 may have signaled the end of a period of dependable moisture in these areas and a return to the more “normal” (that is to say, unfavorable) weather conditions of the early 1960s.

One Soviet meteorological report also evaluated the period between 1966 and 1970 as the best, in terms of weather, in the whole post-war history of Russia (*Agroklimaticheskyy prognos...*, 1978). In contrast, the period 1970 to 1975 was regarded as being even worse than 1960 to 1965, when two large droughts, in 1963 and 1965, resulted in the fiasco of the virgin lands campaign. Between 1970 and 1975, the country also experienced two more serious droughts—in 1972 and 1975. Moreover, the Soviet report called the drought of 1975 the most severe in the history of the country in the twentieth century. In general it was concluded that weather conditions in the ninth five-year period had worked against Soviet farmers, while in the previous five years (1966–1970) the weather had greatly helped in achieving good harvests.

Our calculation of the share of sown area affected by drought for different years (on the basis of Seljaninov’s Hydrothermal Coefficient) confirms that weather conditions in the first half of the 1970s were worse than between 1960 and 1965, while the years 1965 to 1970 were relatively favorable (but certainly not the best) (Figure 8.2.). Soviet agricultural statistics, however, show that average figures for harvests for the country as a whole, as well as for the regions (with the single exception of the Volga region), between 1971 and 1975 were higher than those for 1966 to 1970. There were opposite trends for weather and agricultural production in the USSR during the period. Weather conditions deteriorated, while agricultural production shows an increase during the decade. A comparison between the periods 1960 to 1965 and 1971 to 1975 is even more striking: two unfavorable periods in terms of weather conditions are characterized by a 40 per-

Figure 8.2. Cereal yield and scale of drought in the RSFSR, 1960–1975



Source: grain production data *Sel'skoe khozyastvo v Rossii*, 2000.

cent difference in average grain production in the USSR (129.5 and 181.3 million tons respectively). Thus the steady increase in grain output through the Brezhnev-Kosygin agricultural reform period can be attributed to progress in Soviet agriculture.

In general, weather conditions between 1965 and 1975 were diverse, and Soviet farming still showed its usual vulnerability to such fluctuations. All reductions in harvests (1967, 1968, 1969, 1972, and 1975) were associated with droughts or dust storms in the main agricultural zone of the country. Despite steady growth in agricultural productivity there was no change in the scale of the variability of the yields, which remained at as high a level as in any other period of Russian history. Moreover, for some regions, such as the Western Caucasus and Western Siberia, the variability of yields increased in the period from 1945–1949 to 1971–1975 (*Agroklimaticheskyy prognoz...*, 1978). It was found that the application of fertilizers gave increased yields in relatively wet weather conditions but the effect became negligible if the weather was too dry (Rudenko, 1958). But the Soviet Union seemed to have learned how to minimize the damage caused by poor weather.

The first decline in this period in terms of gross grain production in the USSR occurred in 1967. Official Soviet statistics show that the drop was associated with a poor harvest in the virgin lands of Western Siberia and Kazakhstan (Table 8.8.). Only a few Soviet papers reported the reasons for the crop failure. For example, *Sovetskaya Rossia* (1968) mentioned that in 1967, Omskaya province (south of Western Siberia) suffered from a “horrible” drought. One Soviet meteorological report regards the drought of 1967 as relatively modest. The report evaluates the impact of the drought on the spring wheat that was dominant in the virgin lands. The dry weather in 1967 affected 30 percent of the sown area of spring wheat and destroyed the crop in an area amounting to 3 percent of the total sown area under spring wheat in the USSR. It resulted in a 10 percent decrease from the average yield of spring wheat in the country. The center of the drought was located in the south Urals and northern and central Kazakhstan (*Trudy gidrometeorologicheskogo instituta SSSR*, 1978). In Western Siberia, yields declined on average to 7.9 centners per hectare and in Kazakhstan to 6.3 centners per hectare.

In the next year, 1968, the Ukraine was the main region suffering from drought. The Ukraine accounted for 60 percent of the winter wheat in the USSR. In that year the failure of the winter wheat crop was a serious setback to the Ukraine. The drought was concentrated in the southern and central regions of the republic. According to Buchinsky (1974) it affected more than half of the territory of the Ukraine, but in spite of the extensive damage it did not have catastrophic consequences for the Soviet Union. However, other sources reported a massive shortfall of 6.3 million tons between the planned and the realized output of grain. The dimension of the failure equaled, for example, the total grain output of Hungary (“Dust storms and grit of Ukrainian politics”, 1969). Also, dust storms were reported in several districts of Western Siberia in the spring of 1968. In Omskaya province, the storms affected about 800,000 hectares of sown area, and 128,000 hectares (about 5 percent) of cereal crops were completely destroyed (*Sovetskaya Rossia*, 1968). Fortunately, wet weather dominated in the RSFSR and good harvests in most regions compensated for the crop failure in the Ukraine (Table 8.8).

The next year, 1969, brought the second decline in grain production, although the calculated drought index shows rather good weather from May to July (Figure 8.2.). The reason was the extremely bad weather that occurred in the winter of 1968–1969. Heavy winter storms, low temperatures, and light snow cover had depleted great parts of the Soviet

Table 8.8. Grain production in the economic regions of the USSR, 1966–1970 (millions of tons)

Regions	1966–1970	1966	1967	1968	1969	1970
USSR	167.6	171.2	147.9	169.5	162.4	186.8
RSFSR incl.	100.5	99.9	89.5	109.6	89.9	113.5
Central Black Earth	10.4	9.5	8.7	10.4	12.0	11.3
Volga	24.2	21.5	22.5	28.3	20.3	28.5
North Caucasus	16.6	19.5	15.6	16.2	11.0	20.8
Urals	14.7	14.4	11.7	19.0	13.4	14.9
W. Siberia	13.4	17.1	9.7	14.2	10.8	15.3
Kazakhstan	20.7	25.6	14.4	19.5	21.6	22.2
Ukraine	33.4	34.1	31.8	27.9	36.5	36.4

Source: *Sel'skoe khozyastvo SSSR*, 1971.

winter crop. Western and Soviet sources point to problems not only for the key wheat and grain crops, but also other areas such as fruits, vegetables, meat, poultry, and eggs.

Indeed, the winter of 1968–1969 had been a hard one for Soviet grain growers. The center of the catastrophe lay in the North Caucasus, which, along with the Ukraine, accounted for 70 percent of winter wheat. The steppe zone of the North Caucasus is an area where cyclones and anticyclones are encountered, causing frequent “black” dust storms. The most windy area is found in the Armavir district (on the border of Krasnodar and Stavropol krai). The area is known as the “Armavir corridor” (*Izvestia*, 1974a). During the 12 years between 1957 and 1969, eight severe dust storms and three droughts were registered in the North Caucasus (*Sovetskaya Rossia*, 1969), but the dust storm of 1969 was the most severe. One Soviet paper reported that the storm began on 1 January in the city of Armavir and lifted so much dust into the air that people had to put plastic bags over their heads when walking in the streets. The storm affected the winter crop in most districts and in some of them crops were destroyed completely (*Izvestia*, 1974a).

Most of the definitive reports of that time on the natural catastrophe came from the North Caucasus, but general growing conditions in the Ukraine were known to be quite poor. In some regions of the republic “the state of the important winter wheat seeding cannot be fully restored. Wind storms of hurricane velocity have blown off the snow cover from the winter grain seedlings in recent weeks, and followed by

recurrent waves of freezing weather, did irreparable damage to the autumn sown grains. Valuable topsoil was blown off the steppes in the affected areas and it appears certain that the winter wheat crop will be decidedly poor” (“Dust storms and the grit of Ukrainian politics”; 1969).

It was reported that the severe winter of 1968–1969 was a major factor in sharply reducing livestock numbers. Since agriculture had always been the poor relation in the economy, building for the storage of fodder and for sheltering animals had lagged behind badly. For example, the Soviet magazine *Sel'skaya Zhizn* (1969) noted that in Volgograd oblast there was not enough proper shelter for cattle and poultry and that only half the herds had suitable cover. The loss of livestock in Kazakhstan, where the climate was particularly severe and shelter was scant, was huge in the winter of 1968–1969 (“Soviet agriculture under fire”; 1970).

In addition to the severe winter conditions, as reported, spring arrived between two and three weeks later than usual that year in most grain regions, which meant a shorter growing season and hence lower yields (“Further Soviet imports of Western grain?”; 1969). In the late summer there were some problems with harvesting. By mid-August, reports indicated that only about 35 percent of the total grain acreage of the country had been cut. That figure should be compared to 55 percent at this time in 1968, and 66 percent in 1966, a record grain year (Reston, 1969).

The Western press reported that the Soviet leadership was facing serious agricultural setbacks for almost the first time since these leaders had come to power in October 1964. The losses in the winter wheat crop were estimated at 10 to 15 percent by Western specialists (*International Herald Tribune*, 1969). Western experts predicted that the grain crop of 1969 might be down to a level of 150 to 155 million tons, but Soviet statistics showed more than 160 million tons, slightly less than in 1968 (“Outlook for the 1969 grain harvest”; 1969) (Table 8.8.). Some Western sources believed that the figures for the 1969 harvests of grain, potatoes, and beets had been inflated (*Christian Science Monitor*, 1970). But it could also indicate that some of the measures undertaken by the Soviet Union to combat weather anomalies were working. The storms occurred in winter, and if the weather in spring and summer was good enough and the measures to save damaged crops were adequate, the harvest would have improved. Statistics show that although the Ukraine and Kazakhstan suffered greatly from the winter frosts and winds, the

final agricultural statistics look quite good for these two key regions. In many areas where the winter wheat had perished it was replaced by spring wheat and corn. For example in Kazakhstan, in the face of heavy losses through winter-kill, a record 98 million hectares were re-sown in the spring, some 9 million hectares more than in 1967–1968. This included some 2.5 million hectares of “above-plan” spring grain land in the Kazakhstan virgin lands and 1.2 million hectares of the RSFSR virgin lands, all of which had been earmarked for clean fallow (*Pravda*, 1969a).

At the same time, the North Caucasus, Lower Volga, and Western Siberia show a considerable decline in grain production. There was continued adverse weather in the spring and summer, and any measures to improve the state of the crop could bring little improvement. One report mentions that in the North Caucasus unfavorable winter conditions and spring and summer drought resulted in maximum losses of grain in 1969 (*Agroklimaticheskyy prognoz...*, 1978). The same report says that Western Siberia was affected by a drought in 1969. The newspaper *Sovetskaya Rossia* (1971b) wrote that Saratov province (Low Volga) suffered from severe drought in the summer of 1969.

Despite the modest harvest, a shortage of feed grain was unlikely to be a big problem that year. Our estimation of the grain balance shows that grain requirements were lower than the harvest (see Figure 8.1.). According to Western experts, the situation could, perhaps, have improved due to the state grain reserve. During the last few years, the Soviet grain reserves had been built up from a perilously low amount in mid-1964 to an estimated current level of about 20 million tons. Experts said that if this estimate were correct, the USSR could easily survive one poor harvest. Foreign feed grain was also available (“Further Soviet imports”, 1969). Thus the observable recession in Soviet livestock production should be attributed exclusively to unfavorable overwintering conditions in 1969.

The eighth five-year period finished with a very good harvest in 1970. In that year the USSR obtained the largest grain harvest in its history, at 186 million tons (*Sovetskaya Rossia*, 1971a). Reports indicated that dry weather had suppressed the silage crop growth in a number of central and southern provinces (*Pravda*, 1970b).

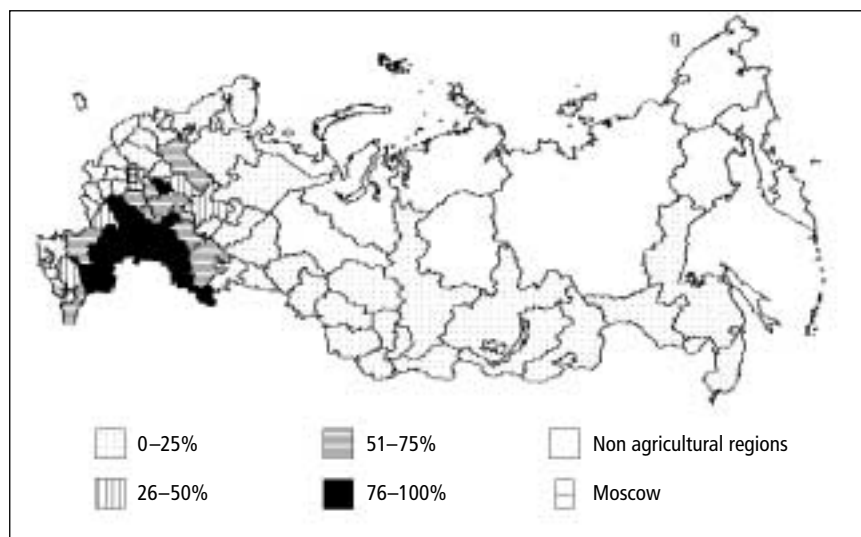
The following period, 1971 to 1975, was far more problematic. The two largest droughts in the history of the USSR occurred in 1972 and 1975. The drought of 1972 was a remarkable synoptic phenomenon. In 1972 an unusually stable and large-scale anticyclone, with its center

located in the Moscow region, was observed (Figure 8.3.). The anticyclone spread over thousands of kilometers in area and was 16 kilometers in height. This vast anticyclone effectively blocked cooler and wetter air masses moving from the Atlantic Ocean. Moreover, as the wetter air mass was coming from the West, the anticyclone strengthened. In the north-eastern part of the Atlantic Ocean, including the Norway Sea, water temperatures were higher than normal. This warm water was additionally heating air in the anticyclone, making it very stable. The wet air mass was forced to move along the periphery of the anticyclone to the west, over western parts of Belarus and to the south over Moldova and western Ukraine. It brought cool and wet weather there, and along the frontier of the two air masses strong thunderstorms and heavy rains occurred. In some provinces of the Ukraine the amount of precipitation reached a record 100 to 150 millimeters (the two-monthly norm) in just a few hours. Along the eastern periphery of the anticyclone, cold arctic air (moving from the Kara and Barents Seas) penetrated into Western Siberia and Kazakhstan, bringing cooler and wetter weather than usual (Buchinsky, 1974).

The drought of 1972 was of the “central” geographical type. In 1972 the summer was extremely hot in the central and northern regions of European Russia. In June, in Moscow, the average temperature was 3.6 degrees higher than normal and in Leningrad 3 degrees higher. Such an anomaly is observed only about once every 20 years. Rostov province experienced its hottest June for 80 years. The scale of the temperature anomaly reached its maximum in the north of European Russia. In Murmansk province (Northwest region), air temperatures at the beginning of July were twice the usual. The air temperature at the White Sea was higher than in the Crimea. This was the first time such anomalies had occurred in around 90 years of meteorological observations. Water temperatures in the northern river of Severnaya Dvina (Arkhangelsk province) reached 26.1 degrees, in the river Neva (Leningrad province) 22.7 degrees, and in the river Moscow 26.2 degrees. This had never happened before. In the south many rivers were drying up. The upper and middle Don registered its lowest recorded water level (Buchinsky, 1974).

Some Soviet sources (Buchinsky, 1974; *Izvestia*, 1974) called the drought catastrophic and compared it with the famous historic drought of 1921. This opinion was an evident exaggeration. For instance, Soviet experts estimated that the dry weather in 1972 affected 28 percent of

Figure 8.3. Area affected by drought in 1972



the sown area of spring wheat and seriously damaged 7 percent of the crop in the USSR. These figures are at the level of 1967 and significantly lower than in 1963 or 1965. The decline in grain production in the USSR was only 13 percent in 1972, although the geographical scale of the drought was colossal as compared with that of 1967. *Agroklimaticheskaya prognoz...* (1978) pointed out two possible reasons for the phenomenon. In 1972 the drought, fortunately, came late in the second half of June and a peak of hot weather was observed in July and August. The second reason was that in the virgin lands of Western Siberia and Kazakhstan, the weather was very favorable, which allowed a good harvest to be obtained there. In Western Siberia the grain harvest was the highest in the decade (Table 8.9.).

One further reason why the harvest of 1972 was saved can be suggested. The Soviet press reported that the good harvest in Kazakhstan was also achieved due to the emergency measures undertaken there. The Soviet authorities campaigned in the “virgin lands” for the emergency sowing of spring wheat in view of the uncertain level of winter wheat output in 1972, as was also the case in 1969. The winter crop was replaced largely by corn and pulses (“Emergency expansion in the ‘new lands’”; 1972). According to *Pravda* (1972), oblasts in northern Kazakhstan planned to sow about half a million additional hectares of spring

Table 8.9. Grain production in the economic regions of the Russian Federation, 1970–1975 (millions of tons)

Regions	1971–1975	1971	1972	1973	1974	1975
USSR	181.3	180.0	168.2	222.5	195.7	140.1
RSFSR	105.3	105	91.6	129.1	112	80.7
Central Black Earth	10.9	9.7	8.6	14.5	12.7	8.8
Volga	20.3	17.9	11.4	29.3	25.1	9.3
North Caucasus	18.7	19.1	13.1	23.8	20.8	14.9
Urals	16.0	16.6	16.6	19.1	18.4	10.5
W. Siberia	15.4	17.2	20.5	16.0	10.5	13.0

Source: *Narodnoe khozyastvo RSFSR*, various years.

wheat. Presumably the area of spring wheat was also expanded in the southern provinces. One press report wrote about successes in combating a drought in 1972 in the Northern Caucasus.

One Western source also reported a massive mobilization of manpower, equipment, and transportation to help bring in the harvest throughout the country. According to this source, in contrast with previous years the entire staff of even heavy industrial enterprises were drafted to the “agricultural front” that year. Moreover, it was suggested that the massive mobilization of workers and technology was one of the factors contributing to the lowest peacetime growth in Soviet industrial output in 1972 (“A time of troubles for the Soviet economy”, 1972).

Despite the relatively modest crop failure (as compared with the scale of drought), it resulted in serious problems, especially for the livestock sector. Soviet official statistics show a decline in the consumption of feed grain that year for the first time since 1965. The reason was that the feed grain demand had increased considerably by the beginning of the 1970s. There were also declines of 3 percent in pasturage and of 7 percent in succulent fodder in the RSFSR (see Table 8.6.). The fodder shortage was responsible for the drop in the pig inventory by 8 percent in Russia in 1972, and in the sheep inventory by 2 percent (*Sel'skoe khozyastvo v Rossii*, 2000). The same figures were reported for the USSR.

Although in 1972 the grain harvest was 13 percent lower than in 1971, it resulted in a grain deficit reaching as much as 30 million tons. Indeed, it was reported that the USSR had to purchase 22.6 million tons of grain abroad. One Western report claimed that the agricultural

shortfalls of 1971 and 1972 had not only put out of reach the ninth five-year plan target for an increase in agricultural production of 21.7 percent, but had also put at risk the 1975 goals for industrial growth and a growth in national income (“A time of troubles for the Soviet economy”, 1972).

The year 1973 produced the highest grain harvest (222.5 million tons) in the USSR. The next year, although official statistics show a relatively good harvest, grain production was 5 to 10 million tons short of domestic requirements and export commitments to East European Socialist countries (*Soviet economy: 1974 results*, 1975). Unfortunately, only a few details are known about weather conditions in the spring and summer of 1974. The calculated drought index shows that weather conditions from May to July should have been favorable in the Russian Federation (Figure 8.2.). However, *Komsomolskaya Pravda* reported that many districts of the virgin lands in Kazakhstan were affected by bad weather conditions (1974). It seems that the virgin lands in the south of Western Siberia were also affected by poor weather. Official statistics show a 30 percent decline in the Western Siberian grain harvest in 1974 (Table 8.9.). On 18 May, *Izvestia* (1974b) reported dust storms in Krasnodar province in the North Caucasus and also in some southern districts of the Ukraine in the spring of 1974.

More serious problems started in the autumn of 1974. In some parts of European Russia there was unusually hot and very dry weather continuing into the autumn. Only 50 to 70 percent of the normal precipitation fell during the autumn and winter of 1974–1975. The problem was that, for the steppe zone, there is a strong correlation (0.76 to 0.8) between the amount of precipitation in the autumn and soil moisture reserves in spring. This water reserve plays a very important role for winter cereals. The worst situation was when a dry autumn and winter were followed by a spring drought. In this case both winter and spring crops would be threatened.

This is what happened in 1975. Drought occurred in regions where moisture deficits in the soil had been caused by the dry autumn and winter. In the southeast of European Russia and western districts of Kazakhstan, drought had already set in by the beginning of April. In some areas air temperatures were 25 to 30 degrees in the first weeks of April, giving rise to strong hot winds. There was a record number of days affected by *sukhovei*. For example, in the Low and Middle Volga the number was twice that of 1921. In many regions the temperature anomaly in April to June was the highest in a hundred years, while

Table 8.9.1. Proportion of sown area affected by drought in the USSR in years of severe drought (percent)

Year	Deviation of yield from trend		
	10 percent	30 percent	50 percent
1975	73	49	35
1963	65	39	10
1946	59	38	7
1965	52	37	29

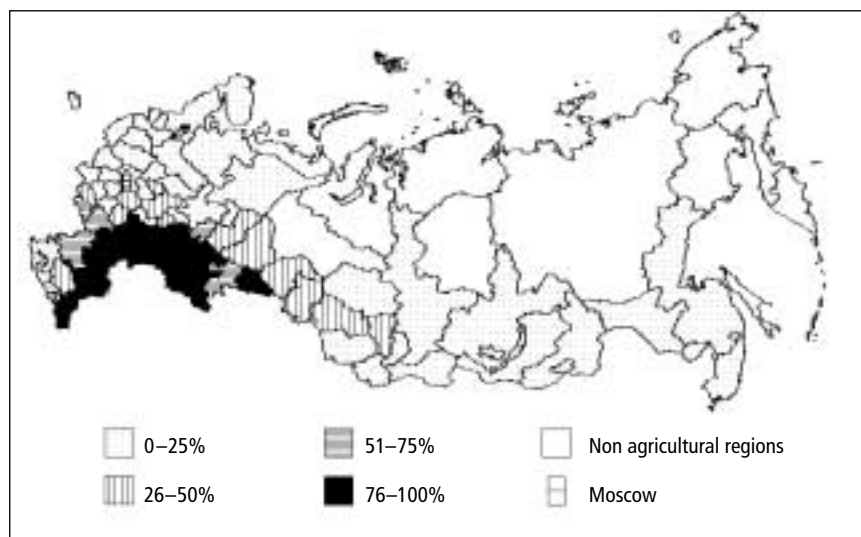
Source: *Agroklimaticheskyy prognoz...*, 1978.

amounts of precipitation reached only 20 to 60 percent of the norm. In some regions no rain was observed for 20 to 30 days. In June and July the drought spread to the east and occupied Northern Kazakhstan and the south of Western Siberia. The parameters of the main droughts of the post-war period show that the drought of 1975 was the largest, and of an unprecedented character (Table 8.9.1.)

The Volga basin, the Urals and Kazakhstan were at the center of the drought (Figure 8.4.). In the Volga basin grain production declined by 59 percent, an amount never previously observed in the post-war period. In Saratov and Volgograd provinces the harvest reached 4 centners per hectare. With precipitation at only 34 percent of the norm and very high temperatures crop failure ensued. Only the drought of 1921 had been more severe, as then 12 percent of the precipitation norm fell in May. In the Urals the drought of 1975 was the most severe since 1891. According to official statistics, in Orenburg and Kurgan provinces average cereal yields were only 3 and 5 centners per hectare respectively. In some areas of the southern Urals, the water shortage was acute because small rivers dried up. In Kazakhstan the losses were evaluated by the report as total (which means that no return of grain was obtained), as they had been in 1965. It was stressed that in Kazakhstan there were two consecutive years of drought, 1974 and 1975, for the first time since 1891 (*Agroklimaticheskyy prognoz...*, 1978). In Kazakhstan average yields in 1975 were as low as 4.6 centners per hectare.

Two other key grain-growing regions were also affected by the drought. In the Ukraine and North Caucasus the harvests were 25 percent lower than in an average year. In the North Caucasus, for two months, temperatures exceeded the norm by 3 to 3.5 degrees, which had not been observed since 1891. Precipitation reached only 38 per-

Figure 8.4. Area affected by drought in 1975



cent of the June norm. Cereal yields decreased to between 11 and 14 centners per hectare. In southern and eastern parts of the Ukraine, the drought of 1975 ranked as the second most severe after that of 1946. The report said that these two regions overcame the adverse weather due to the relatively mild previous winter. Eastern districts of the Black Earth region also suffered from the dry weather.

There were some indications that certain measures had been undertaken to save the harvest, as in previous years. It was reported that in Kazakhstan only a rapid decision to plough up the withered crops and re-seed with grass and fodder, plus massive deliveries of grain and fodder from the state, permitted farmers to survive without slaughtering their beef and dairy cattle, poultry and pig stocks. But, on the whole, the situation in 1975 was catastrophic. Experts said the decline in grain production put a brake on the overall economic growth of the Soviet Union. They claimed that the drought of 1975 would be felt for many years to come in the economic sphere (Bush, 1975).

The Soviet cereal harvest fell to 140.1 million metric tons, the lowest level since 1965, from 195.7 million tons the previous year. This crop failure resulted, first of all, in the most serious crisis in the Soviet livestock sector in peacetime. Grain feeding in 1975–1976 fell almost 17 percent below the previous year's level to around 89 million tons. Official

statistics also show that in 1975 the Soviet Union collected 10 million tons less of other varieties of feed than in 1974, including a 4 percent decline in pasturage and a 9 percent decline in succulent feed. The problem was that the Soviets not only had less grain to use for feed, they also had more livestock than ever before. Livestock numbers on state and collective farms as of June 1975 were at record levels—87 million cattle, 55.2 million pigs, 151.7 million sheep and goats, and 577.2 million poultry. These factors together forced the country, in August 1975, to begin the emergency slaughtering of livestock, which in a brief span of five months reduced poultry and pig numbers by almost 32 and 26 percent respectively (*Foreign Agricultural Circular*, 1980). Pigs and chickens were usually culled first, since these are the easiest to replace.

The USSR had to import a record 26.1 million tons of wheat and coarse grain between July 1975 and June 1976 (see Table 8.9.4.). Western experts suggested that the amount of grain imports was probably determined by the capacity of Soviet ports to handle grain shipments. This capacity was believed to be limited to about 2 million tons a month (Bush, 1975). Thus the Soviet Union imported the maximum possible amount of grain at that time. A simple calculation shows that 26.1 million tons of foreign grain was sufficient to feed only 4.5 million standard livestock units (calculated for cattle and pigs). Thus the grain imports could only partly relieve the feed shortage, and the massive slaughtering of the Soviet herd was inevitable in 1975.

The size of the pig herd in the Soviet Union only recovered by 1979. In 1976 an unprecedented decline in meat production, by 10 percent, was observed in the USSR as a result of the excessive slaughtering in 1975. Meat production returned to its normal level in 1977.

8.3. Food problems

Question: “What is long, green, and reeks of sausage?” Answer: “An elektrichka (local train) pulling out of Moscow.”

The food situation in the USSR between 1965 and 1975 differs considerably from that of the previous decade. In the Khrushchev era, food crises manifested themselves in shortages of grain, including bread and flour. This sometimes happened in the first years of the new decade, but from 1965 to 1975 meat and dairy products had, in some

respects, become more important than grain, even though grain and potatoes remained the staple foods. Improved living standards had heightened the national appetite. A growth in cattle numbers in a country is a good indication of the trend in the supply of livestock products for the economy and a reflection of the improvement in the quality of the national diet. Soviet nutritional science was already placing a greater emphasis on raising the consumption of animal proteins, fruits and vegetables in the national diet to achieve better health and labor efficiency. The provision of a quality diet was one of the problems recognized by the Communist Party in its effort to raise living standards (“Cattle numbers rise...”, 1967). The five-year plan for the period 1971 to 1975 was proclaimed as the first medium-term plan to be “consumer oriented”. To meet the targets the Soviet Union already relied on large-scale imports, not only of grain but also of meat, butter, and fruits.

The lack of information on food problems in the Soviet Union is still a major obstacle in an analysis of food issues, but there are reasons to believe that no acute food crises occurred in the USSR between 1965 and 1975. Neither the Soviet press nor Western correspondents reported any severe food crisis requiring emergency measures. In 1969, a bad year, one Western journalist noted that although “Russians seem to gripe more about food than anything else in casual conversations, they almost always talk about how much better it is now than it used to be” (*Washington Post*, 1969).

Soviet statistics on food consumption show impressive progress from the early 1960s. The first half of the period (1965–1970) had brought a 15 to 20 percent increase in meat and dairy consumption, while in the previous five years supplies of these most valuable staple foods had not improved (Table 8.9.2.). By 1970, the average food consumption had risen above 3,000 kcal a day. This level of calorie intake was already close to Western standards. It is true that consumption of such important staples as meat and fruit remained considerably lower than in the United States, and too much bread and potatoes were still consumed by the Soviet people. The Soviet food ration was far from optimal, but it was moving in the right direction. As some Western experts noted, the Soviet norms had also been lowered in the period between 1965 and 1969, evidently in order to give more realistic norms for the current period (see Table 8.9.2.).

Table 8.9.2. Soviet per capita consumption (kilograms per annum)

Foodstuffs	Norm of 1965	Norm of 1969	1960	1965	1970	1973	1974	1975	1975 plan	USA in 1971
Bread	120	120	164	156	150	145	142	142	–	65
Potatoes	120	97	143	142	130	124	121	120	–	66
Vegetables	164	146	70	72	82	85	87	88	109	81
Meat	87	82	40	41	48	52	55	58	59	110
Milk	467	433	239	251	308	307	315	316	340	254
Eggs (units)	365	292	117	124	160	194	206	216	192	321
Sugar	44	36	28	34	39	41	41	40	43	46
Fish	–	18	9,8	13	15	16	16,5	17	22	5
Fruit	–	112	23	28	35	40	37	37	–	48

Sources: *Planovoe khozyastvo*, 1969, Kisilev and Shagin, 1996.

However, Soviet statistics on food consumption were found not to be in agreement with the regularly reported scarcity of different food staples in Soviet stores. There was no food crisis, but nor was food abundance observed in the Soviet Union between 1965 and 1975. Soviet statistical data on meat production were close to those of some Western countries (for example Finland and Norway), which experienced no problems with food supply. To explain the empty shelves in Soviet stores, Western experts could not help but question the reliability of Soviet data on food consumption and production (*Daily Telegraph*, 1979). Official Soviet figures for crop and livestock production were believed to be inflated. It is not easy to prove this suggestion for crop harvests, but official figures for meat production were certainly exaggerated. Soviet meat production statistics, in contrast to Western statistics, include as meat lard, pork fat, heads, and edible organs. For example, calculations by the United Nations Food and Agriculture Organization (FAO) show meat production in 1968 was only 36 kilograms per capita, while Soviet statistics gave a figure for meat consumption per capita of as much as 48 kilograms (*Christian Science Monitor*, 1970). Thus the FAO estimate is 25 percent lower than the Soviet data. The US department of agriculture also presented alternative figures for the USSR per capita meat consumption for the first half of the 1970s, figures that are 11 to 15 percent lower than those given in official Soviet statistics (*Foreign Agricultural Circular*, 1978). Thus the correction factor ranges between 11 and 25 percent from Soviet data on meat consumption and production.

Besides this exaggeration of the official data on meat output, official statistics say nothing about the poor quality of the food staples sold in Soviet stores. To Western visitors, even the food in Moscow seemed overpriced and of poor quality. According to one American journalist there was a striking resemblance between the fatty meat and half-rotten vegetables sold in ordinary Soviet stores, and what was sold in the slums of Washington and other American cities (*Washington Post*, 1969). For most Russians, such staples also seemed to be of unsatisfactory quality.

It is hard to square the regular disappearance of some staple foods from Soviet stores with the Soviet people's overall growth in income between 1965 and 1975. Theoretically, too rapid a growth in food demand that exceeds increases in agricultural production can result in the emergence of a food deficit. Indeed, during the decade the average monthly income of the Soviet population had increased by more than 50 percent while gross agricultural production had grown by only 26 percent. At the same time, food prices remained unchanged: bread, macaroni, cereals, vegetable oil, most fresh and preserved fish, and sugar cost the same as in 1955, and meat and dairy products the same as in 1962.

In the 1970s, Soviet propagandists often explained food shortages in this way. For example, prominent Soviet journalist Vladimir Pozner pointed out that the main reason for the interruption of meat supplies was that everybody could afford to buy meat due to the state subsidies in the livestock production sector. One kilogram of red meat cost four rubles in the state system, yet the same kilogram would sell for a top price of two rubles in the shops. Supposing meat prices were to be raised, say to five rubles a kilogram, which would pay for production costs and ensure profits, meat would be left lying on the counters, because many people would not be able to afford it. Then there would be no meat shortage, argued the Soviet journalist ("Soviet consumers...", 1977).

Our estimates show that during this period Soviet people still had to spend a large part of their income on food. In the period from 1965 to 1975, more than 40 percent of the average family budget was allocated for the purchase of food (Table 8.9.3.). For example, for 1965 official Soviet sources gave a very detailed figure for the proportion of food expenditure—45.7 percent (Kiselev and Shagin, 1996). But this figure does not include such important items as alcohol and tobacco. These items were the most heavily taxed products in the Soviet Union, bringing more income than, for example, the state subsidy for meat production. The price of vodka, in an ordinary Russian store, was as much as

Table 8.9.3. Share of Soviet family budget spent on food consumption, 1960–1975 (rubles)¹

Foodstuffs	Price for 1 kg	Cost of food basket				
		1960	1962	1965	1970	1975
Bread	0.15	2.05	2.05	1.95	1.87	1.78
Potatoes	0.10	1.19	1.19	1.18	1.08	1.00
Vegetables	-	-	-	-	-	-
Meat	2.08	4.20	6.93	7.10	8.32	10.10
Milk	0.30	4.38	5.97	6.30	7.70	7.90
Eggs (units)	0.10	0.78	0.98	1.00	1.33	1.80
Sugar	0.90	2.10	2.10	2.55	2.93	3.00
Fish	—	—	—	—	—	—
Fruit	—	—	—	—	—	—
Oil	3.60	1.28	1.68	1.92	2.13	2.43
Total cost per person		15.98	20.90	22.00	25.36	28.00
Total cost per family		58.30	76.29	77.88	89.80	99.15
Average wage		81.00	88.00	97.00	122.00	146.00
Family budget		145.80	158.40	174.60	219.60	262.80
Cost of food basket as percentage of family budget		40%	48%	45%	41%	38%
If alcohol is included		53%	60%	56%	50%	45%

Sources: Bush, 1972; Kisilev and Shagin, 1996.

3 rubles (3.41 dollars) for half a liter. According to Soviet official data (then unpublished and classified as “secret”), in 1965 alcohol accounted for 20 percent of the total expenditure on food products in the USSR. According to the same source, expenditure on alcohol reached 19.5 rubles a month for the average family (6.5 bottles of vodka). Thus the total expenditure on food consumption reached 45 to 50 percent of the family budget for the period. By comparison, in 1965, Americans spent 28.5 percent of their income on food purchases and, even when alcohol consumption was included, the figure only rose to 33 percent (Kiselev and Shagin, 1996).

Table 8.9.4. USSR imports of grain and meat, 1966–1977

Year	Grain (millions of tons)	Meat (millions of tons)	Year	Grain (millions of tons)	Meat (millions of tons)
1966	3.3	0.12	1972	22.8	0.13
1967	2.2	0.06	1973	11.3	0.13
1968	1.1	0.06	1974	5.7	0.52
1969	1.8	0.08	1975	26.1	0.52
1970	0.8	0.15	1976	11.0	0.36
1971	4.7	0.22	1977	19.1	0.62

Sources: Severin and Carey, 1978; *Foreign Agricultural Circular*, 1980.

A comparison between Moscow and Western capitals in relation to retail prices for different food staples confirms the very low income of Soviet citizens in terms of actual purchasing power. Meat prices in Moscow in 1976 were the highest among Western capitals in terms of work-time units. It was estimated that in 1976 the American worker would have to put in 17.2 hours of work-time, but his Soviet counterpart would have to work for nearly 65 hours to purchase the same hypothetical weekly family food basket. The latter figure seems to be very high, as there were only 40 hours in a working week in the USSR. If one compares retail prices for commodities and services, this difference between actual Soviet incomes and those of Western workers becomes even more striking (Bush, 1976).

Despite the growth in income of Soviet people during the decade, they remained mostly poor and still had to make a choice between bread and meat. We suggest that the income of Soviet people limited rather than stimulated the growth in demand for food in the period 1965 to 1975. Thus one can reasonably suggest that the physical shortage of agricultural produce was a primary cause of food problems during this period. If the Soviet population's purchasing power had been greater, then food shortages would have been even more evident between 1965 and 1975.

The following is a review of some reports on food problems which can be found in Soviet and Western media between 1965 and 1975. They show that failures in agricultural production developed into food shortages, as happened in 1969. After 1970, food and grain imports became an important permanent measure to smooth over food deficits in the country (Table 8.9.4.).

In 1966, despite a record harvest, there were some indirect indications of a grain shortage in the USSR. For example, one Soviet paper said that tractor drivers and other agricultural workers who were being seasonally mobilized for the virgin land sovkhozes were promised two to four centners of grain after the fulfillment of the plan. Additionally, the workers were permitted to buy the same amount of grain in the sovkhozes. It is evident that such privileges, even in a normal food situation, could possibly indicate problems of bread supply in the country (*Ekonomicheskaya Gazeta*, 1967).

Also, the Western press noted that, despite the bigger harvest, there had been no easing of the curbs imposed three years before on the distribution of flour to consumers. Citizens could not buy flour in the stores in Moscow or other cities outside wheat-growing areas. Moreover, that year's holiday ration (for 7 November) was no larger than the previous year's (the ration was two kilograms per person in each family). The flour, described as high quality, was sold at 46 kopecks per kilogram. The ration price amounted to 23 cents per pound, while the retail price of flour in the United States was about 12 cents a pound (*Washington Post*, 1966). Flour rationing was abolished only in the following year, 1967.

The most successful branch of the Soviet livestock sector was egg production. Soviet egg production had expanded from 27.4 billion cases in 1960 to 29.1 billion cases in 1965, and 31.4 billions cases in 1967. However, even this expansion in output had to supply a population of 230 million. Britain, for example, had a supply of about 40 billion cases to satisfy only 55 million consumers. A shortage of eggs was evident in most regions of the USSR. For example, it was reported that during the winter of 1967, in the Ukraine, despite the over-fulfillment of the egg production plan, it was only possible to buy eggs occasionally in Kiev stores while egg prices were high at the local market even though some large poultry complexes were located around Kiev. They all worked well, but their production fell short of demand. There was even a supply problem for medical and children's institutes. It was pointed out that one of the reasons was lack of storage facilities which would allow the summer production of eggs to be preserved when they were in abundance (*Izvestia*, 1967).

One of the most serious food situations was observed in 1969. As a result of the severe winter and poor facilities for the storage of fodder and for sheltering animals, the livestock inventories fell, meat produc-

tion stagnated, and milk output decreased. According to official data, the average annual per capita consumption of meat fell to 47 kilograms (from 48 kilograms in 1968) and that of fruit and melons to 76 kilograms (from 79 kilograms in 1968), although the consumption of eggs rose to 148 as opposed to 144 in 1968. The private sector share of gross agricultural output also fell (Bush, 1971).

In the spring of 1969, reports about problems in the food supply were published in the Western media. Western studies of the Moscow markets, which were usually better stocked, showed that meat had been in short supply for a year or more. Eggs were missing from many state stores in Moscow earlier that year. The capital had also been without such imported items as lemons for two months or more. Western experts wondered whether this indicated heavy pressure on Soviet hard currency reserves from other, non-agricultural sectors of the economy (*New York Times*, 1969). One Western journalist wrote that in Moscow there had been a shortage in the stores of special flour for blinis (Russian pancakes) that year, but this was only the first year that regular flour had been available in ordinary stores on a continuous basis (*Washington Post*, 1969).

In the summer, dry weather brought additional problems for Soviet farmers. In July, *Komsomolskay Pravda* reported that numerous letters had been sent by readers with complaints about the scarcity of meat in the stores (1969a). One of the indicators of food problems was the reintroduction of administered prices in kolkhoz markets in the summer of 1969. It was reported that maximum prices had been introduced in Moscow kolkhoz markets that were set at twice those of corresponding items in the state retail stores. One of the first legislative acts of the post-Khrushchev administration was to lift restrictions on private plots and livestock holdings. As a part of this move, in 1965 the fixing of prices in the kolkhoz market was lifted too ("Administered prices reintroduced at kolkhoz market", 1969). As was reported in 1969, many Muscovites were willing to pay the high prices at the kolkhoz market. Some Russians estimate that about 40 percent of Muscovites shopped regularly—at least once a week—at the kolkhoz market (*Washington Post*, 1969).

The difficulties in the food supply still existed in the following winter/spring period of 1970. A *Pravda* editorial on 13 January (*Pravda*, 1970a) recognized that an "unwarranted" decline in livestock and poultry in 1969 had resulted in the sharply reduced production of meat, milk, and eggs. *Pravda* also reported a drop in the production of fruit

and vegetables. Foreign press correspondents spoke of the scarcity of most food supplies in Moscow and other large cities in the countryside. People were traveling 300 to 400 kilometers to Moscow in order to buy meat, which was in short supply in the city itself (“Soviet agriculture under fire”, 1970).

In March 1970, the RSFSR premier, G. I. Voronov, confirmed that problems had existed in relation to meat production since 1969. The official, addressing agricultural workers in the Moscow oblast, rebuked those “who are blaming last year’s bad weather for all the difficulties”. He pointed out that industrial workers were right to complain about food shortages. “They are making just demands on us,” he said, “and ask us why interruptions in supplies of meat and fresh vegetables are tolerated and why potatoes in the shops are of poor quality” (ibid.).

Western experts pointed out that the shortages would take some time to rectify. This was confirmed by the deputy chairman of the RSFSR Gosplan, who noted in *Sovetskaya Rossia* on 24 March that in 1970 the supply of eggs and meat would only reach 56 percent and 60 percent of demand respectively, and that there would have to be an annual increase of 10 percent in meat production during the years of the ninth five-year plan (1971–75) (*Sovetskaya Rossia*, 1970b).

The food shortage was especially noticeable in the provinces. One Western journalist wrote that the provincial press was full of complaints that for weeks there had been no meat on the market, or only meat of inferior quality (*Christian Science Monitor*, 1970). According to a letter from the Siberian town of Novokuznetsks, published in *Izvestia* on 10 March: “It often happens that meat and dairy products are spoiled. The inspectors claim to see nothing.” In one week *Izvestia* received 7,830 letters of complaint about meat shortages. At the beginning of 1970, on-the-spot observers reported a meat shortage even in Moscow. The problem was reflected in the many closed stands in Moscow’s kolkhoz market. This fact was reported in the 1 March issue of the Ministry of Agriculture’s daily, *Sel’skaya Zhizn* (1970).

The year 1970 was of great importance for the Soviet Union, as it was the centenary of Lenin’s birth. That year brought the best grain harvest in the USSR, and official statistics show some improvements in the livestock sector. Red meat supplies in 1970 remained limited, but pork supplies rose by 11 percent and poultry meat inventories climbed from previous levels by 22 percent (*Journal of Commerce*, 1971). However, in order to boost public morale, the Soviet government decided,

for the first time, to import substantial quantities of meat, poultry, eggs, butter, and even potatoes from the West. The Soviet Union was reported to have already purchased about 121,000 tons of meat, worth 88 million dollars (including 30,000 tons of beef and 30,000 tons of mutton from Australia and pork from the Netherlands). Western sources reported that more contracts were being negotiated and predicted that large imports would continue for a year or two until herds were built up to more normal levels. Further details of Soviet imports emerged in a news agency report from Brussels on 19 February. The Soviet Union was apparently interested in purchasing 60,000 to 80,000 tons of butter from the European Common Market countries, having already bought from them 20,000 tons of poultry and 160 million eggs, as well as potatoes. On 8/9 February 1970, *Le Monde* reported the sale of 8,850 tons of poultry worth about 4.5 million dollars to the Soviet agency Prodimtorg (“Soviet agriculture under fire”, 1970).

Despite two large-scale droughts—in 1972 and 1975—in the next five years the food situation seemed to improve and, for the time being, food imports, especially for the technical intelligentsia, temporarily relieved the situation. Already in 1971, a year with a good harvest, the purchase of agricultural products abroad considerably increased as compared with any previous year. In November 1971 it was announced that grain, including 2 million tons of corn, 600,000 tons of barley and 300,000 tons of oats, worth about 136 million dollars, had been sold by the United States to the Soviet Union. On 16 August it was reported that the Soviet Union had also bought 500,000 tons of wheat valued at 25 million Australian dollars from the Australian Wheat Board in a cash deal. There was also a report that the Soviet Union had purchased corn from some other countries (Thailand, Argentina) to an amount equal to that imported from the United States. Most of the grain purchase was to supply Soviet livestock (Bryan, 1971). Additionally, the USSR had bought 200,000 tons of meat (Severin and Carey, 1978).

In 1972 there was a severe drought, and Western experts predicted that the Soviet Union would experience bread or flour shortages, as one-third or more of the winter wheat harvest of the country was lost. (“Emergency expansion in the ‘new lands’”, 1972). With this loss, many livestock farms were also expected to be short of feed reserves for the winter. The USSR had to import a record 22.8 million tons of grain to maintain the size of its herd and to meet the demand for bread and flour (Table 8.9.4.).

In the following year meat production decreased by 106,000 tons, evidently because of the lowering of the productivity of livestock caused by feed shortages in the winter of 1972–1973. Taking into account that the population of the USSR had increased by 1 percent, one might expect a fall in meat consumption per capita. However, Soviet statistics show that meat consumption in fact increased from 51 kilograms in 1972 to 52 kilograms in 1973. Western experts suggested that the share of meat allocated for the state reserve was considerably cut in 1973. If, in 1973, as in previous years, about 1 million tons of meat were left for the state reserve, then meat consumption per capita would have been less than 51 kilograms rather than 52 kilograms, as shown in the official statistics. To relieve the food situation the Soviet authorities sanctioned a seasonal lowering of the prices of vegetables in summer, as reported in many Soviet papers (*Leningradskaya Pravda*, 1973).

In 1974, although meat production was reported to be at a record level, the USSR imported over 0.5 million tons of meat at a cost of nearly half a billion dollars. This amounted to an additional 2 kilograms per capita. Evidently, this large import was made to bring the meat consumption figure into line with that planned by the end of the ninth five-year plan period.

A severe drought affected the country in 1975 and destroyed any hopes of the Soviet Union meeting the plan targets for food production and consumption. Experts predicted that the decline in grain production would put a brake on overall economic growth, but the worst situation was expected to be in the consumer sector. Fodder shortages led to the massive slaughtering of livestock. Although the Soviet press (*Izvestia*, 1976) optimistically reported that kolkhozes and sovkhoses were selling more meat, milk, and eggs than in 1974 as a result of the transformation of the livestock sector on the basis of industrialized farming, the Soviet Union had to import more than 26 million tons of grain and 0.5 million tons of meat at a cost of 2.2 billion dollars.

In 1976, an unprecedented decline in meat production by 10 percent was observed in the USSR as a result of the massive slaughtering of livestock in 1975. Western experts wrote that in 1976 the Soviet people suffered the worst food deficits for over a decade. There were numerous reports of widespread and prolonged shortages of many foods, including meat, dairy products, sugar, vegetables, and vegetable oil. By the end of 1976, the main party paper, *Pravda*, admitted that the severe drought of 1975 had caused a decline in the productivity of the livestock

sector that had had a negative effect on the meat and milk supply of the population in 1976 (1976b). The Soviet press also reported chronic shortages of some other staples, especially vegetables, in the stores, even in the Ukraine (*Pravda*, 1977). Large imports of meat and feed grain in 1976 (although a good harvest was obtained in the country) relieved the food situation.

Neither the livestock inventories nor meat production had recovered by the following year. Meat imports reached a peak for the decade (at more than 600,000 tons) and the amounts of feed grain purchased abroad were very high. One interesting move was in relation to the private sector. In 1977, thousands of workers in consumer cooperatives began to “uncover” the existence of foodstuff reserves among the population and to “conclude” purchase agreements. It would seem, in other words, that the local authorities had resorted to radical measures in the aftermath of CPSU General Secretary Leonid Brezhnev’s recommendation, made at the 16th Soviet Trade Union Congress, that greater responsibility be placed on the consumer cooperatives “for organizing the sale of surplus agricultural products that exist among the rural population and on kolkhozes”. The reports did not indicate exactly by what means the cooperatives were managing to conclude purchase agreements. Farmers were not being invited to central purchasing points for the conclusion of sales agreements for food products: instead, visits were being paid to private plots on a mass scale by representatives of consumer cooperatives. To illustrate this, a report from the Belgorod oblast states that the cooperatives had to purchase 15,000 tons of seed potatoes and potatoes from the population. “In all villages, visits to the plot of each homestead are being carried out and contracts for the sale of potatoes are being made.” Similar reports came from Voronezh and Novosibirsk oblasts (“Critical situation in the food sector”, 1977). This move towards the private sector was in contrast with the policy of previous years. In the early 1970s it was usual to find articles in Soviet papers which angrily reported that inhabitants of some villages were purchasing bread to feed to their livestock.

It seems that by 1977 the situation caused by the drought of 1975 had somehow been transformed into a sort of chronic food shortage which was then to last for many years. The main features of this situation were the periodical and unexplainable disappearance of very staple products from the shops, including imported products, and the shutting off of a large section of the population from the purchasing of essential

staples in central cities. In the archives of Radio Liberty there is a document that perfectly describes these chronic food problems in the USSR. The description is based on personal observation of the food supply situation in three major Soviet cities—Moscow, Leningrad, and Minsk—during 1977. The author was a 30-year-old Moscow writer who had traveled widely in the USSR during the course of the year (“Food supply situation...”, 1978).

Moscow, the capital of the USSR continues to enjoy an unequal share of the available food supplies, offering both more variety and better quality than elsewhere. This has led to a situation in which not only bona fide visitors, but also rural inhabitants from the remoter areas of Moscow and Moscow oblast, travel into the center to stock up on supplies. “Guests of the capital” are quite indiscriminate and snap up literally everything. Throughout the year at Novoarbat Delicatessen in Kalinin prospekt there was a coffee line that took two to three hours to get through. In the first half of year a similar line formed for tea. In the second half of 1977, the rumor took hold that every newly released batch of coffee would be the last and from then on no coffee would be available in the USSR at all. Obtaining coffee became a mass psychosis. As a confirmation of these rumors (and maybe as a result of them), cocoa also disappeared from the stores and confectioners’ supplies were depleted, although bars of chocolate were available through November.

In the course of the year the supply situation at central delicatessen stores somewhat improved. Frozen chickens from the USA, France, West Germany, and the Netherlands enjoyed great popularity, together with butter from France and home-produced pre-packed milk. Workers preferred to buy cheaper products from Bulgaria, Hungary, and Poland (the price difference sometimes amounted to one or two rubles per kilogram for the same product). The quality of meat rose in direct proportion to the proximity of the store to the center, although queues formed in all parts of the city. Each customer was rationed to one whole length of sausage. The quality of these cheap varieties has deteriorated, but they constitute a staple food for workers, lower-paid clerks, and students. The employees of embassies and the diplomatic corps (Third World countries mainly), the well-to-do intelligentsia, and the majority of office workers prefer to buy their meat at the free markets, paying twice the price for the same cuts of meat. A free market is practically the only place where fruit and vegetables and greens could be obtained,

although the supply was irregular. In state stores the choice is wretched, restricted to spring onions, potatoes, carrots, and beets.

The privileged position enjoyed by the capital has become even more marked this year. When visiting relatives in any part of the USSR, Muscovites never fail to take some food with them. Aid in the form of food parcels is taking on ever greater proportions, with fruit being sent from the Transcaucasian republics, the Ukraine, and Belorussia to Moscow, and canned meats, fats, and sausages being mailed from Moscow to the Urals and Siberia. Food parcels sent to relatives living east of Moscow were often hand carried by long-distance railroad conductors. In various “closed stores” attached to institutions during the year, the supply was little better than in regular central delicatessens.

Leningrad: In the spring of 1977 the food supply situation in Leningrad was unsatisfactory. There were queues waiting for meat, sausages, and fruits; the prices in the markets were high. In fact, the population was absorbed with the problem of food to an extent which surprised even Muscovites. In the vicinity of Bolshevikov prospekt one had to queue for an hour to enter the “universam” or self-service store.

Minsk: At practically all levels of the social scale, from workers up to top party management, food was bartered between Minsk and the villages in the neighboring oblasts. When city dwellers go away for the weekend, generally to their native villages, they invariably take with them confectionery (candy or cakes) from the city. In exchange, they bring back several sacks of potatoes for the winter, pork dripping, honey, apples. As a result, they only need to buy things to supplement this basic winter food store and provide variety. This is how people maintain their diet in the Belorussian capital.

8.4. Summary

This period was at one time regarded as a relatively successful one in the history of Soviet agriculture. Due to economic stimuli, for the first time farming became a profitable business for the farmers themselves. A strong upward trend in grain production resulted from the adoption of a whole range of measures, including the use of more fertilizers and farm machinery, the introduction of better seed varieties, a better mix of crops, and improvements in planting and harvesting practices. However, twice in the decade—in 1972 and 1975—a grain deficit shook the Soviet

Union. Only because of large food imports from the West was there no serious food crisis.

The weather in 1972, and, especially, 1975, was indeed disastrous. It was one cause of the severe feed grain crises in 1972 and 1975, but not the only one. The crises also indicated that a wrong direction had been taken in the new development of Soviet agriculture. From the very beginning of the 1970s, the Soviet Union started to import feed grain to support the planned growth in livestock production. The imports were obviously regarded at the time as only a temporary necessity on the path towards the modernization of the livestock sector. However, it turned into a trap for Soviet agriculture. The modernization of the livestock sector could never achieve the expected results. The gap between grain requirements and grain production had been growing, not falling, throughout the decade, making the country vulnerable to any weather fluctuations.

NOTES

- 1 Table 8.9.3. shows our estimation of the share of the family budget that Soviet people had to allocate for food purchases on a monthly basis. A food basket corresponds to official Soviet data on food consumption per capita for a given year. For an estimate of the cost of a family food basket we use statistics for an average Soviet family, which, in the early 1960s, was 3.65 people, and between 1965 and 1975, was 3.54 (*"Naselenie Rossii za sto let"*, 1998). We also take into account that the husband's earnings were not the sole income, since most Soviet women worked outside the home; the normal Soviet urban family had 1.8 wage earners (Bush, 1964). It is worth noting that there was a jump in expenditure on food from 1960 to 1962, which was caused by the price reform of 1962. This jump is evidence of a serious deterioration in the living standards of the Soviet people, caused by Khrushchev's reforms.

CHAPTER 9

The period of agricultural stagnation (1976–1990)

The period of so-called developed Socialism was later, under Gorbachev, renamed “the period of stagnation”. During this period the Soviet Union developed as an industrial power able to compete with the USA and Western European countries. Due to the discovery of large oil and gas fields in Western Siberia, the Soviet Union strengthened its position in the world energy sector in the 1970s. The fuel industry started to play the role of the main sponsor of all important Soviet industrial and agricultural projects. However, domestic capacity and technology were not sufficient and the USSR was obliged to purchase pipes, gas extraction technology, and compressors from Western countries. Despite its favorable position in the world fuel market there were clear indications of a slowing down of Soviet economic growth. The rate of industrial growth fell from 8.4 percent in the second half of the 1960s to 3.5 percent between 1981 and 1985. In the agriculture sector the corresponding figures were 4.3 percent and 1.4 percent. The year 1976 was regarded by many experts as a watershed for the Soviet economy, since in this year the process of decline became more apparent in all areas, including agriculture.

9.1. Major developments in agriculture

During this period the Soviet authorities continued to make massive investments in the agricultural sector. In the tenth five-year plan period (1976–1980), at 172 billion rubles (230 billion dollars), the proposed total would be 31 percent up on the 1971 to 1975 figures, whereas the rise in the Soviet economy was only 24 percent (*Economist*, 1977). The following five years (1981–1986) were characterized by only a 10 percent increase in investments. In absolute figures this means that 38 to 40 billion rubles were spent on agriculture each year as opposed to 34 billion

rubles a year in the previous five years (*Izvestia*, 1980b). The slowing of the rate of growth in investment in Soviet agriculture is understandable, since expenditure had already reached a very high level by the end of the 1960s. The share of state investment in agriculture had risen from 23 percent in 1966–1970 to 26 percent in 1971–1975. Between 1976 and 1980, capital expenditure on agriculture had consistently accounted for 27 percent of the total budgeted by the USSR. In the early 1980s, the share of the total state investment reached 33 to 35 percent for the whole agro-industrial sector¹, with the same 27 to 28 percent for agriculture.

The main focus of the investment was still the livestock sector, which was intended to be transformed into a highly industrialized and specialized branch of the economy. However, there were three new long-term projects which absorbed a considerable part of the money allocated to agriculture.

A large part of the investment was to go to the forest-poor podzolic soil areas. The non-black earth zone included 29 oblasts with a population of more than 58 million (or 44 percent of the total population of the RSFSR in 1975). Agricultural lands occupied an area of about 52 million hectares, including 32 million hectares of arable land or 24 percent of the total arable area in the RSFSR. In 1975 this area produced 13 percent of the USSR's grain, 35 percent of its potatoes, 19 percent of its vegetables, 16 percent of its meat, and 21 percent of its milk. Grain production was scheduled to increase from 18.8 million tons in 1975 to 31 million tons in 1980 (Severin and Carey, 1978). This 15-year plan was announced for the first time by Leonid Brezhnev in March 1974. Disappointed by the instability of harvests in the steppe zone, the Soviet authorities turned to the forest zone in the hope that the area could become a stable base for grain output to counter the erratic production caused by unreliable rainfall in the Black Earth zone and virgin lands. The non-black earth zone has a relatively short growing season but the highest average annual rainfall of any agricultural area in the USSR. In its note to the government, Gosplan particularly stressed that this area had never experienced a severe drought. The report also noted that because of weak support in the years of the virgin lands campaign, the growth of local agriculture had become slower, and even declined, in relation to the livestock production sector (Kiselev and Shagin, 1996).

About 35 billion rubles (45 billion dollars at the official exchange rate) out of the 172 billion rubles was planned to be spent in the 1976 to 1980 period in order to develop agriculture in the non-black earth

zone of European Russia. First of all, these regions required enormous capital investment. The new program included land reclamation projects (irrigation and drainage) as well as the application of more agricultural chemicals, the construction of livestock complexes, the creation of a transport network, and the resettling of small villages as “non-prospective”. The share of the gross fixed investment in agriculture in the zone was planned to grow from nearly 15 percent of the total figure for Soviet agriculture during 1971 to 1975, to just over 20 percent during 1976 to 1980. Fertilizer deliveries to the zone were to increase from 21 percent to 26 percent of the total fertilizer deliveries for Soviet agriculture as a whole (Severin and Carey, 1978). The main challenges for the plan were the depressed state of local farming and labor shortages.

The availability of labor was one of the factors which certainly constrained future agricultural output in the USSR in this period. Although farmworkers still comprised over one-quarter of the total labor force, agricultural employment dropped from 45 million in 1960 to 34 million in 1976 as employment opportunities swelled in urban areas. Migration from farms involved primarily the young and the more skilled, leaving behind people largely outside working age. Almost half the rural population of 1970 was under 15 or over 59, compared with about one-third in urban areas (Severin and Carey, 1978). During the 1980s, the employable rural population decreased by a further 15 percent.

The labor shortage was an especially acute problem in the non-black earth zone. As one Western paper put it, “no one in his right mind, it seems, wants to live in the countryside in almost any part of Central Russia” (*Guardian*, 1980). Between 1960 and 1975 the number of employable people in the non-black earth zone decreased by 34 percent, and the number of young people fell by almost two-thirds. According to Soviet statistics, less than 4 percent of newly trained young agricultural mechanics remained in rural areas. In mid-1975, in 80 to 90 percent of villages in nine oblasts of this area, the number of young people was only 30 to 38 (Kisilev and Shagin, 1996). In the 15-year plan for the accelerated development of agriculture in the zone, the Soviet planners provided no solution to the labor shortage except some declarations about the need to raise living standards in rural areas in the future.

The second long-term agrarian project of the Soviet government was to organize territorial “agro-industrial complexes”. A decree in the summer of 1976 proposed the transformation of the country’s 40,000-odd collective and state farms. They were to form larger associations.

The new associations would be expected to give up the present system of mixed farming and to specialize in particular types of production. They would also form close links with industry so as to turn themselves into agro-industrial complexes. By 1990, 11 such large-scale complexes had been organized in the Russian Federation, but the idea yielded little. Western experts believed that it was wrong to amalgamate already giant production units into monstrous agro-industrial complexes instead of changing management structures (Bush, 1975).

The third project, named the “Food Program of the USSR”, was announced in May 1982 in the wake of the deep food crisis which had struck the country in 1979 to 1981. The Food Program proposed no new ways for raising agricultural production and promised enormous investment to the agricultural and food industries for the period 1982 to 1990. The government was going to cover all expenditures for the melioration, construction, and operation of large irrigation systems, for protecting soils from erosion, and for the technical renovation of Soviet kolkhozes and sovkhozes (Lappo, Kozlov, and Michailov, 1983). For example, in 1980 the agriculture sector received 2,562,000 tractors and 722,000 grain harvesters. According to the food program, however, agriculture should have received 3,740,000 to 3,780,000 tractors and 1,170,000 grain harvesters and other agricultural machines between 1982 and 1990. The Soviet Union planned to expand large-scale irrigation in order to receive more stable harvests in the steppe zone. The area of irrigated lands was to reach 20.8 million hectares by 1985 (between 1975 and 1980 the area had increased from 14.5 to 18.0 million hectares), and 23 to 25 million hectares by 1990. The irrigated lands were to produce 20 to 22 million tons of grain (as compared with 10.1 million tons in 1976–1980), or 8 percent of the total production by 1990—250 to 275 million tons (*ibid.*). The preparation of irrigated areas for grain growing is an expensive business. The capital cost reported from the Soviet Union was 5,000 to 10,000 rubles per hectare (6,750 to 13,500 dollars per hectare, or 6.8 billion dollars for 1 million hectares), with an annual operating cost of 100 rubles. These figures were reasonable enough for a high-value crop such as cotton, but not for grain, except in a country determined to be self-sufficient (*Economist*, 1977).

The chronic problem of large harvest losses because of the poor infrastructure in the Soviet Union was specially targeted in the food program. Losses were incurred at each stage of farming—sowing, harvesting, transportation, and storage. The greatest crop losses in the

Soviet Union resulted from delays in harvesting because of machine shortages. It had been scientifically proven that losses of up to 2.7 centners per hectare were caused by allowing crops to stand for ten days after they had fully matured. Strains that were less resistant to over-maturation could account for losses of up to 16.4 percent of the total yield, and crops stored in piles over too long a period could result in another 13 percent loss in yield. The harvesting of cereal crops in the USSR lasted from 25 to 39 days, instead of from 9 to 10 days. With a delay in harvesting of 20 days after maturity, the shortfall in grain yield could be as much as 32 percent (*Ekonomika sel'skogo khozyastva*, 1976).

The inadequate number of grain stores was yet another serious problem. In 1978, granaries on kolkhozes and sovkhozes could accommodate only 70.5 million tons, or 64 percent of the amount requiring storage. The country had to transport a huge amount of grain over colossal distances to supply non-productive regions, and a lack of transport led to a further considerable loss of grain. This was a problem even in the case of transporting imported grain across the country. Because the volume of grain being purchased abroad by the USSR amounted to dozens of millions of tons, and because the Soviet railroad system was already taxed beyond its capacity with domestic freight, the additional burden of having to move large shipments of imported grain inevitably led to a number of problems. The railroad system did not have a sufficient number of trucks specifically intended for grain transport and had to rely on wagons that not only unsuitable for carrying loose, dry cargo but were frequently damaged themselves. The result was inevitably serious losses of grain both in the process of loading and en route ("Much of the USSR's imported grain lost in transit", 1982).

Western experts believed that roughly 15 percent was to be deducted from Soviet grain output data because of these losses. It was also concluded that the often applied deduction of 15 percent seems accurate only as an average for several years, while for individual years the necessary deduction might range from a maximum of 28 percent to a minimum of 8 percent (Wadekin, 1978). In 1982, the year of the adoption of the food program, V. Tikhonov, a member of the USSR Academy of Sciences and chairman of its Scientific Council for Economic, Social, and Legal Problems of the Agricultural Complex, stated that "during harvesting, transporting, storing, and industrial processing we lose about one-fifth of the gross yield of grain, vegetables, and fruit and berry crops" (*Sotsialisticheskaya industriya*, 1982).

Table 9.1. Investments in Soviet agriculture, and agricultural output (public sector), 1976–1980, as compared with the early 1960s (percent)

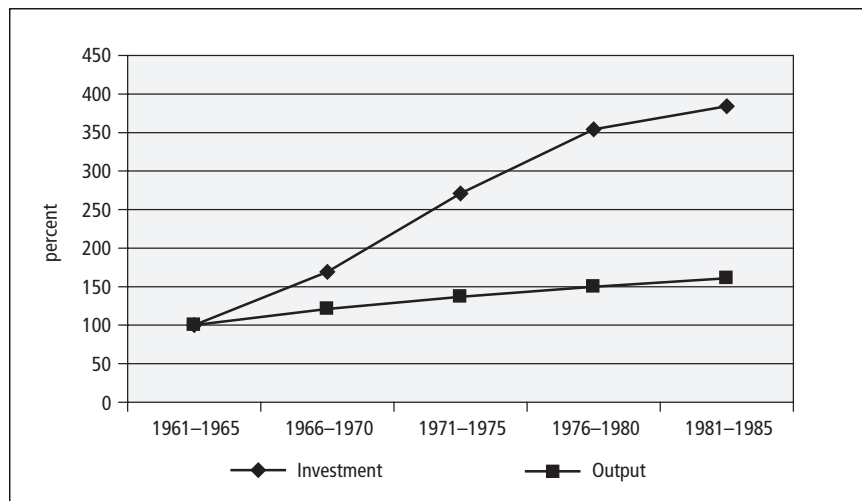
Period	Investment		Agricultural output		
	Total agro-industry	Agricultural sector	Total	Crops	Livestock
1961–1965	100	100	100	100	100
1976–1980	359	332	150	146	153

Source: Severin, 1984.

Spending money does not guarantee getting a good return on it. The Soviet authorities appeared to be determined to invest an increasing share of its scarce resources in its socialized agricultural sector, even with the prospect of continually diminishing returns. Keith Severin (1984) discovered that Brezhnev's agricultural accomplishments by the late 1970s were modest when compared with the investments made in agriculture from the start of the period. In relation to capital investment, production was evidently lagging, as Table 9.1. shows.

The slowdown in the growth of agricultural investment efficiency had become obvious by the middle of the 1970s. According to the *Economist*, 15 January 1977, each extra ruble of agricultural capital stock in 1951 to 1960 added half a ruble to output, but only a third of a ruble in 1961 to 1977. Also, Severin and Carey (1978), analyzing changes in the productivity of Soviet farming, found a striking difference between the performance of Soviet agriculture in the late 1960s and early 1970s. Using three-year moving averages for net agricultural output, the authors found that 1971 to 1975 was marked more by stability than growth; all the growth—6 percent—in farming output was attributable to greater inputs, long relied-on by planners to stimulate output. According to their findings, the 10 percent growth in inputs during the period masks a 4 percent drop in productivity. This means that growth was not proportional to investment. The fall in productivity in the 1970s could partly be explained by the way inputs increased. Fixed capital grew by about 8.5 percent per year in the late 1960s but increased by almost 11.5 percent yearly between 1971 and 1975. Presumably, much of the construction was to support the regime's livestock program and did not immediately result in increases in agricultural production. Some Soviet economists believed that the resulting increasingly negative return on capital would be quickly reversed (*ibid.*).

Figure 9.1. Growth in investment and agricultural output, percent

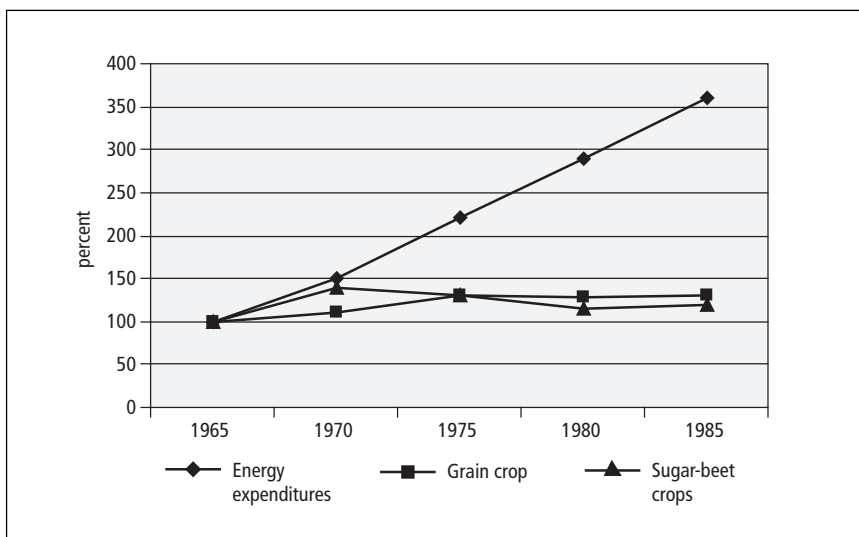


Source: calculated on the basis of the report *Narodnoe khozyastvo v RSFSR v 1983, 1984*.

This suggestion proved to be too optimistic, as the following graph shows (Figure 9.1.). The gap between investments and agricultural output had been widening since 1975. According to official Soviet statistics, from 1980 to 1990 the increase in fixed capital investment had reached 40 percent, the application of mineral fertilizers had increased by 22 percent, and the growth in energy expenditures had been 61 percent. However, total agricultural production had grown by only 12 percent.

Fertilizer application and energy expenditures were the main elements of investment, but they had not had the same stimulating effect on crop production as earlier. For example, an investigation carried out by V. Afanasiev for Soviet Moldova showed that the growth in energy expenditure and the growth in harvests of sugar beet and grain after 1965 were directly linked only during a five-year period (Capcelea, 1996) (Figure 9.2.). Beginning in 1971 to 1974 until the second half of the 1980s, the resources applied were not proportional to the harvest of these crops. It is normal in most developed countries that a 1 percent increase in agricultural production goes along with a 2 to 3 percent increase in energy expenditure. For example, in the United States, the doubling of the harvest was accompanied by a tenfold increase in energy expenditure (“Mechanizatsia i elektrofikatsiya”, 1982). In Soviet Moldova

Figure 9.2. Energy expenditure dynamics for grain and sugar beet in Soviet Moldova



Source: Capcelea, 1996.

in the period 1970 to 1985, a 140 percent increase in energy expenditure was accompanied by only 1 percent growth in grain production.

Mineral fertilizers were the other principal source of grain gains in the early Brezhnev era. In the new period the Soviet authorities still relied on increases in fertilizer application. By 1980, it was planned to send 120 million tons to farms, 60 percent more than the amount delivered in 1975. About one-third of the fertilizer delivered to farms in 1975 was applied to grain. By 1980, this amount was to be doubled. Some Western experts pointed out that the impact of planned applications was limited by low quality, improper chemical mixes, transportation and storage losses, and improper application. A CIA report on the prospects for Soviet agriculture for the early 1980s pointed out that the shortcomings of the Soviet fertilizer program resulted in the average nutrient content of fertilizer in 1975 being only 35 percent, which meant high transportation and application costs per unit of nutrient. Moreover, granular fertilizers—easier to apply than powders—accounted for only 40 percent of fertilizer supplies (see Severin and Carey, 1978). A common feature for all countries is that the gains from fertilizer applications do not follow an exponential curve. At some point, different for

Table 9.2. Fertilizer application and grain production gains in Soviet agriculture in the 1970s

Period	Fertilizer application (millions of tons)	Response rates (tons of grain per ton of fertilizer)
Before 1969	1 to 10	2 to 3
1969–1973	up to 20	1.2 to 1.5
1974–1975	up to 25	1.2 to 1.3

Source: Severin and Carey, 1978.

each crop, response rates first slow, then decline. Indeed, excessive applications of fertilizer have been blamed for declining sugar beet yields in some areas. In the extreme, too much fertilizer may destroy the crop. The largest gains were achieved with the initial applications, as shown in the following table (9.2.) based on the USSR's countrywide experience with grain (*ibid.*).

This tendency towards the slowing of the agricultural sector's rate of growth seems to have been ignored by Soviet planners when they elaborated the plan targets for the period 1975 to 1990. The Soviet Union suggested that agriculture would develop at approximately the same rate as between 1965 and 1975 (Table 9.3.). Besides, the Soviet planners operated with average figures for five-year plan periods, but these averages can be misleading. The average plan targets for the period may appear to be a reasonable extrapolation of the trend observed in the previous decades, but the problem is that they make little sense at times when the yields fluctuated sharply. To reach the planned figures for grain and meat production in 1976 to 1980, as extrapolated from the 1971 to 1975 figures, one would suggest a growth of 20.5 percent (4.1 percent a year) and 8.5 percent (less than 2 percent a year) respectively. But the actual level of agricultural production in 1975, a very poor year, was much lower than the average figures for that period. Our estimates show that, in order to meet the plan targets by 1980 (235 million tons), Soviet grain production should have increased by 75 percent, or 11 percent a year, from the base year of 1975. As for meat production, the growth should have been 27 percent (6 percent a year) to reach the 1980 target (17.3 million tons) if the starting point for the calculations was from the 1975–1976 fall in meat production caused by the drought of 1975. A similar approach was presented by Wadekin (1981) in his analysis of the Soviet plans for 1981 to 1985².

Table 9.3. Plan targets for agricultural production in the USSR, 1971–1990

Parameters	Plan targets			
	1971–1975	1976–1980	1981–1986	1986–1990
Grain	195	219	240	255
Meat	14.0	15.2	17.0–17.5	20–20.5
Milk	92	95	97–99	104–106
Eggs (bln units)	46	58–61	72	78–79

Source: Severin and Carey, 1978.

The most striking thing concerning the five-year plans for the development of Soviet agriculture in the 1970s and 1980s, is that the Soviet planners seemed to ignore the great fluctuation in grain harvests. It is reasonable to expect that the Soviet planners would take into account the variability of grain yields and suggest some sort of buffer between the plan for grain production and that for livestock growth in order to ensure that any drop (by, say, 10 percent from the average figure) in the grain harvest would not strongly affect the livestock sector. It seems that the Soviet planners made their plan for grain production in another way. According to Severin and Carey (1978), the grain production figure for 1980 was evidently calculated from the planned figure for livestock production. The 1980 production of 17.3 million tons of meat suggested a feed grain requirement of roughly 140 million tons (8 kilograms of feed grain per kilogram of meat). With other requirements—seed, food, and industrial use—projected at roughly 95 million tons, a harvest of 235 million tons—exactly the crop officially planned—would be the minimum necessary to cover 1980 domestic requirements. With such a fine balance between production and demand, any deviation in the actual grain production from the average level would immediately result in a feed grain shortage for Soviet livestock.

In the previous decade, in order to support its ambitious livestock program, the Soviet Union had had to rely on imports of feed grain in the few poor years. After 1972, the Soviet Union became one of the largest grain importers in the world. After the setback of 1975, the US-USSR grain agreement stipulated that the USSR would buy 6 million metric tons of wheat and corn each year of the five-year period. It is surprising that the five-year plans for 1970 to 1980 say nothing about grain import requirements, giving the impression that the Soviet Union was determined to achieve the announced high targets without grain pur-

chases abroad. Leonid Brezhnev made it very plain at the February 1976 Party Congress that he did not like the dependence on Western grain imports, and that putting an end to it was a top priority. The 1976 to 1980 plan allowed for total trade with the West to increase by only 31 percent, whereas it had doubled in the 1971 to 1975 plan period. There was no sign that imports of Western industrial goods would be limited to this low level, thus the sharpest restraints had therefore to fall on the agricultural sector (*Economist*, 1977).

The food program of 1982 again announced the target not only of becoming self-sufficient in grain and food production but of entering the world market as a grain exporter by 1990. Mikhail Gorbachev, the last Soviet leader who personally elaborated the food program, rather favored continuity in agricultural policy than radical change, especially in the first three years of his leadership (Hanson, 1985). Not surprisingly, he maintained the traditional position concerning grain imports. In 1985, in his first major speech (in Tselinograd, Kazakhstan) concerning the development of Soviet agriculture, he made clear his hopes of achieving the goals of the food program based exclusively on the countries' own resources. He said that grain production should reach 250 million tons in an average year and about 200 million tons in a poor year.

Soviet plans for the development of the agricultural sector very soon proved unrealistic. In fact, average grain harvests were much lower than official expectations and, what was worse, had shown no growth during the period while the demand for feed grain had been increasing. This resulted in an acute chronic grain shortage. For example, in 1980 actual grain production was about 190 million tons instead of the planned 235 million tons. About 140 million tons of feed grain was required for producing the planned 17.3 million tons of meat, and about 95 million tons to cover other grain requirements. Thus only 95 million tons instead of 140 million tons were available for feeding livestock. In 1980, the Soviet Union had to import 28 million tons from abroad, more than even in the disastrous year 1975. The total amount of available feed grain, including imports, reached about 120 million tons, presumably sufficient for producing 15.1 million tons of meat (13 percent short of the planned figure). Our estimate is confirmed by *Pravda* (1984), which reported that the livestock sector consumed about 120 million tons of grain annually.

Five years later, in 1985, the Soviet Union produced approximately the same amount of grain as in 1980—191.7 million tons—while the live-

Table 9.4. Food and grain imports by the USSR, 1985–1990

Food import	1985	1986	1987	1988	1989	1990
Grain (millions of tons)	44.2	26.8	30.4	35.0	37.0	32.0
Meat (thousands of tons)	857	936	858	719	696	1,129
Butter (thousands of tons)	276	194	403	440	218	561

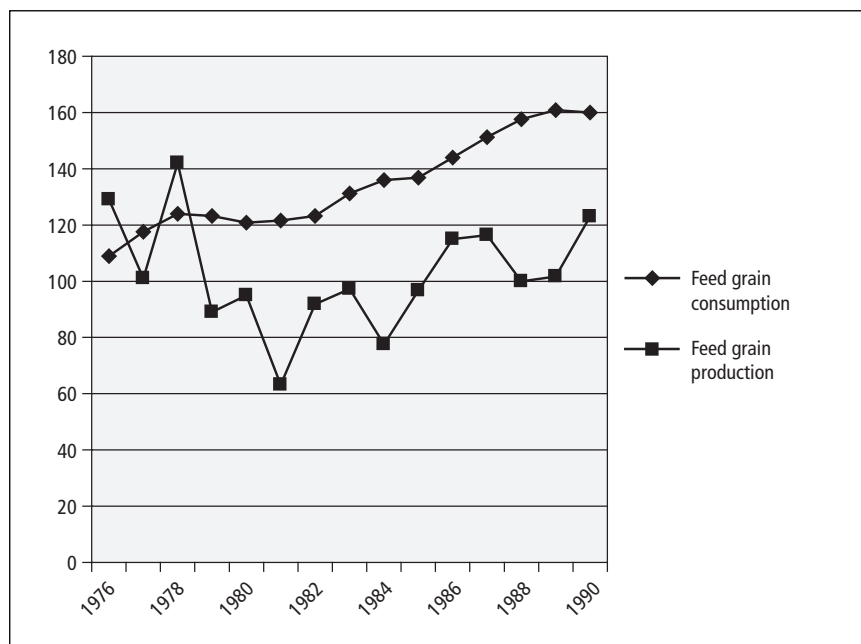
Source: *Narodnoe khozyastvo SSSR v 1989, 1990.*

stock inventories had grown by 3.5 percent since 1980. This meant that again only 97 million tons of feed grain were available, sufficient for producing only 12 million tons of meat. A colossal amount of grain, 44 million tons, was imported, but it only partly helped relieve the feed grain shortage. The Soviet Union produced 17.3 million tons of meat instead of the 18.3 million tons planned (initially as much as 19.5 million tons were planned).

Four years later, in 1989, grain production was at the same level of 192 million tons and imports of grain accounted for 37 million tons (Table 9.4.). Large amounts of grain were likely to be withdrawn from the state reserves. Although meat production reached its highest level and even approached the plan targets (19.6 to 19.8 million tons), it was not the “success story” reported, as about 35 to 40 percent of the meat was produced due to grain imported from Western countries. Additionally, the Soviet Union had to purchase a large amount of meat and other livestock products abroad (Table 9.4.).

Figure 9.3. summarizes our estimates for the production and consumption of feed grain in the USSR from 1976 to 1990. Feed grain production was calculated by the deviation of non-feed grain consumption (about 95 million tons) from statistical data on total grain production (see Severin and Carey, 1978). Such estimates for “feed grain production” give a figure higher than the actual Soviet feed grain harvest, because a considerable part of food grain (wheat) was allocated for the feeding of Soviet livestock. Feed grain consumption was calculated by multiplying data on meat production by the average amount of grain needed for producing one kilogram of meat (8 kilograms of grain per kilogram of meat). On the whole, the figure shows that the situation had seriously deteriorated during the 1980s as com-

Figure 9.3. Balance of feed grain in the USSR, 1976–1990



Source: *Narodnoe Khozyastvo SSSR*, various years.

pared with the 1970s, when such feed shortages occurred only in years of severe drought.

The whole set of unresolved problems in the Soviet livestock breeding sector are certainly an important cause of this permanent grain shortage in the USSR between 1975 and 1990. The Soviet feed grain conversion ratio was 2 to 2.5 times lower in the USSR when compared with Western countries, and it would have been more effective to import meat than feed grain (Serova, 1996). In other words, Western farmers produced far more meat from the same amount of feed grain, and to change this ratio should have been the most important task for Soviet farmers.

At the beginning of the 1980s, livestock production remained an extensive sector of Soviet agriculture. Livestock inventories on a per capita basis reached 0.53 heads, which was higher than in many countries and close to that in the United States and Western Europe. But, as *Pravda* reported in 1980, this potential was still used unsatisfactorily because of the low productivity of the livestock. Most republics of the

USSR preferred to increase the size of their herds rather than livestock productivity. For three years—from 1978 to 1980—livestock numbers increased in the USSR by 9.6 million heads. At the same time, productivity increased only slightly (*Pravda*, 1980a).

The USSR's food program suggested that about 80 percent of the growth in meat production should be achieved due to an increase in productivity. Here, the program said that the country had a large reserve for the development. The average live weight of cattle sold to the state increased from 309 kilograms in 1970 to 361 kilograms in 1978, but then decreased to 352 kilograms in 1980. The same tendency was observed in pig breeding (*Agitator*, 1982). According to the food program the average live weight of cattle should not be less than 400 to 500 kilograms (485 kilograms was the slaughter norm in the USA) (*Chicago Tribune*, 1982b). In the existing system of purchase prices for livestock production, cattle at 440 kilograms per head live weight meant that profitability for raising livestock could reach 86 percent ("USSR national affairs...," 1979). According to the program, the daily weight gain of livestock needed to double. In 1982 the average figure for daily weight gain was 400 grams as compared with 800 to 1,000 grams obtained on the most advanced farms. Such low productivity led to great losses to farmers. Pigs procured from farms in the public sector had an average live weight of only 105 kilograms per head. In this sector, the average weight gain reached only 220 grams instead of 550 to 650 grams. In a number of provinces and republics the figure was less than 220 grams. Such low daily productivity resulted in too long a period in which animals were fed: 27 to 28 months for cattle, although the norm was 14 to 16 months, while in pig breeding the feeding period reached 15 to 16 months instead of 7 to 8 months. This led to an excessive consumption of feed grain per kilogram of meat. A radical improvement of the feed ration was needed in order to raise productivity.

Some new economic stimuli were proposed to increase productivity in the livestock sector.³ However, the Soviet Union still emphasized the industrialization of livestock breeding as a major tool for raising productivity. The situation in terms of the industrialization of the livestock sector, however, looked curious. At the beginning of 1974 in the USSR there were 380 large livestock complexes instead of the 745 planned to be built according to the five-year plan (Tenson, 1975). In late 1979 it was reported that more than 400 specialized livestock complexes had been constructed and about 4,500 complexes were under construction.

According to the Soviet plan, by 1975 some 60 percent of pigs and 45 percent of cattle should have been kept in large industrialized complexes (ibid.). But in 1977 the industrialized livestock complexes produced only about 30 percent of the pork, 8 percent of the beef, and 5 percent of the milk in the country (*Ekonomika sel'skogo khozyastva*, 1978). By 1980, about 50 percent of the cattle, 40 percent of pigs, and almost 90 percent of poultry should have been kept in buildings with a high level of mechanization (*Ekonomika sel'skogo khozyastva*, 1980). The plans evidently remained out of reach (except poultry production), as in 1982 the Soviet propaganda journal *Agitator* gave the same figures for the 1985 plan. The journal said that due to industrialization the share of beef produced in large complexes would increase from 10 to 20 percent, pork from 30 to 40 percent, and poultry from 80 to 90 percent (*Agitator*, 1982).

These figures give an idea of the slow progress in the construction of industrialized livestock complexes. The actual situation was rather the opposite. On 21 May 1980, *Pravda* reported that some republics had been “excessively enthusiastic” in the process of the construction of large livestock complexes. In these regions the number of complexes exceeded demand. For example, in Moldova the construction of additional complexes for 301,000 heads was needed but the capacity of the facilities constructed was sufficient for double the number of animals—786,000 heads. At the same time, earlier complexes constructed for half a million heads were not yet working at full capacity, the paper claimed. A similar situation was observed in some other republics. In Lithuania, Belarus, and Estonia, from 1966 to 1978, the growth in the herd by one head was accompanied by the construction of 0.9 to 1.2 stall units. In the Russian Federation the latter figure was as high as 2.2. This meant that the construction of livestock complexes outpaced the growth of the herd. Such an uneconomic approach resulted in the waste of money allocated for the livestock sector, *Pravda* reported (1980).

By 1980, the end of the tenth five-year plan period, there were 527 such complexes for pig breeding, 311 for cattle, and 910 for poultry in the USSR. It was reported that more than 50 percent of the complexes had not yet worked at the projected capacity (*Agitator*, 1982). By January 1981, milk complexes were operating at 25.6 percent of their projected capacity, calf breeding complexes at 30.7 percent, beef complexes at 51.8 percent, and pig complexes at 39.1 percent. The major reason for this situation was that in many areas the construction of live-

stock breeding complexes was carried out in isolation from the breeding and fattening base. A leading expert from Gosplan confirmed that a considerable proportion of large complexes were supplied with feed grain mainly from the state reserves and the complexes “did not work rhythmically”. There was also a shortage of non-grain fodder base.

In 1978, the Central Committee of the CPSU and the USSR Council of Ministers had issued a significant decree “On the Ancillary Farms of Enterprises, Organizations, and Institutions”, that instructed ministries and departments “to set up ancillary farms attached to enterprises, organizations, and institutions” in order to “increase the output of agricultural produce and thereby improve public catering for workers and employees” (*Izvestia*, 1978). Western experts regarded this decree as an evident retreat from the party policy of the specialization and concentration of agricultural production. There were signs, too, that the setting up of the ancillary farms at industrial enterprises was a longer-term measure, as the decree authorized credits for up to six years from Gosbank (the central state bank) for building the farms (“Encouragement of factory...”, 1979).

The majority of livestock products were still produced at traditional kolkhoz farms rather than industrialized complexes (*Izvestia*, 1983b). However, on traditional livestock farms the same excessive consumption of feed grain per unit of livestock production could be observed. At the beginning of the 1980s, the proportion of concentrate in the total feed consumption had already reached its peak, at 36 to 39 percent, as compared with 30 to 32 percent in between 1971 and 1973, and 27 to 28 percent between 1966 and 1970. In some regions the proportion of concentrate reached about 50 percent of animal feed rations. Most of this grain was delivered from the state reserves (*Izvestia*, 1981a). It is generally known that concentrated feed, even if properly supplied, gives good results only in the case of pork, poultry, and egg production, but is economically unprofitable in milk and beef production complexes. The problem was that concentrated feed became dominant even in milk production. In this sector more than 30 percent of the total fodder consumed was feed grain. In 1980, feed grain consumption per liter of milk reached twice the level recommended by agricultural experts. This excessive consumption of grain did not result in an adequate increase in milk production per cow. The number of abortions per cow increased because of imbalances in the rations (*Izvestia*, 1984).

Table 9.5. Sown area of main cereal crops in the Russian Federation, 1970–1987 (percent)

Cereals	1970	1980	1987
Food cereals:	65	58.0	50.5
Winter wheat	15.5	18	13
Spring wheat	39.2	31	27
Winter rye	8	7	8.5
Rice	0.3	1	0.5
Buckwheat	2.0	1	1.5
Feed cereals:	35	42	49.5
Winter barley	1	1	1
Spring barley	17	24	26
Oats	8	9	10
Millet	2	2	2.5
Legumes	4	4	6
Corn	3	2	4

Source: Kruchkov and Rakovetskaya, 1990

One specific Soviet problem was the unsatisfactory structure of cereal crops. Agricultural statistics on food and feed grain for 1970 to 1980 show that food grain production prevailed over feed grain, despite a much higher demand for the latter (Table 9.5.). In the late 1970s, the feed grain demand was 120 to 140 million tons, while the demand for food grain was 50 to 60 million tons. Thus more than 70 percent of the total grain demand was for feed grain. It is reasonable to expect that the overall structure of cereal crops should have reflected this ratio. Although the problem of crop structure was widely discussed in the Soviet Union, no radical change had taken place since the late 1970s. In 1987, half of the sown area under cereals was still used for food grain. At the end of the 1980s, the Soviet media were still calling for the replacement of wheat with barley in feed rations (*Pravda*, 1988b).

The reason was that, in order to meet their plan targets, the administrations of provinces, districts, and collective farms preferred to sow crops that promised higher harvests. Wheat was the most favorable crop as it was less labor intensive and had a relatively good selection of varieties in comparison with many feed cereals (for example, barley). On many farms, wheat grain was widely used for feeding. In some areas 45 to 50 percent of the wheat harvest was fed to livestock. Wheat is exclu-

sively a food grain and is the most unbalanced among cereals in terms of animal feed quality. The digestibility of wheat protein is very low compared with barley or oats. According to Soviet agricultural experts, in order to satisfy the daily needs of pigs in certain nutrients, three times more wheat grain has to be consumed than other cereals. According to some estimates by Soviet agricultural experts, the total over-consumption of concentrate reached 25 million tons (in the USSR) annually in pig-breeding and poultry-producing farms, and one of the reasons for this was the use of wheat as feed (*Kommunist*, 1985). The allocation of considerable amounts of wheat for feeding purposes explains why the Soviet authorities had to import large amounts of better quality wheat from Western countries.⁴

Another problem was the poor preparation of mixed feed. An emphasis on mixed feed production was one of the tactics tested by the Soviet Union in its longstanding drive to increase the efficiency of feed grain. By 1980, less than half of the grain used for feed had been processed into mixed fodder, the greater proportion of grain landing unprocessed in the feed lots, thus constituting a much less efficient feed ("A preliminary look at Soviet agriculture...", 1980). On 16 July 1981, *Izvestia* called mix feed the chief reserve for the saving of feed grain (1981b). It argued that if all feed grain were processed into mixed feed, it would save 12 million tons of feed grain in the Russian Federation.

Unfortunately, the increase in the production of mixed feed during the 1980s was accompanied by a fall in quality. In 1985, the official journal *Kommunist* criticized the poor quality of mixed feed produced in the country. In Vinnitsk province (Ukraine), 22 inter-farm plants for producing mixed feed (for several local farms using the farmers' own grain) were in operation and provided as much as 60 percent of grain for livestock as a mix. The problem was that the mixed feed was of poor quality. Kolkhozes complained about the low quality of the mixed feed, which was also one and a half times more expensive than the grain they had delivered to the inter-farm plants. Because of the poor quality, the total expenditure on fodder in livestock production did not decrease but still reached 1.7 feed units per liter of milk and 10 feed units (oat equivalent) per kilogram of weight gain for pork. The journal pointed out that these figures were the same as in the 1950s, but that then the main feed had been cheap, coarse vegetation rather than expensive mixed feed. The journal argued that half the pig farms in the province were unprofitable (*Kommunist*, 1985).

On 12 May 1988, in the era of Gorbachev's *glasnost* (openness), *Pravda* published some interesting details about the development of the Soviet mixed feed industry (1988b). Before 1977, mixed feed had been produced according to relatively strict standards. After 1977, new, lower standards were implemented and caused a deterioration in quality. Only four parameters were checked: moisture, temperature, fineness, and the presence of certain toxins. However, such an important parameter as protein content was not checked. This meant that the mixed feed plants of the Ministry of Procurement functioned only a little better than the inter-farm plants⁵ (*Sovetskaya Rossia*, 1991).

The primary cause of the excessive consumption of feed grain in livestock production was the unsatisfactory development of other categories of feed, primarily hay and pasture. The Soviet authorities certainly understood that a radical increase in the production of non-grain feed would be the key to solving the problem of the low productivity of Soviet livestock and the excessive consumption of grain. In 1980, at the March Plenum of the CPSU Central Committee, a decree was adopted on additional measures for increasing the production and quality of fodder. The decree pointed out "to party, administrative, and agricultural bodies, that the shortage of coarse and succulent fodder is one of the chief causes of low productivity in stockbreeding, and led to a considerable over-consumption of grain, which cannot be tolerated in the future" (Radio Moscow, 1980). Shortages of protein supplies in feed were claimed to be the single most important problem confronting the Soviet livestock economy.

The decision was adopted to increase the area of cultivation of clover, alfalfa, soy, and other fodder crops rich in protein. The inclusion in the feed ration of soy, the richest in protein, would allow a reduction in feed grain consumption by 25 to 30 percent (*Izvestia*, 1981d). In the Russian Federation, the share of legumes within the total crop area under cereals reached only 4 percent in 1980. The problem was that legume crops (peas, soy, beans, and lentils) need a longer period of high temperatures and good soils than can be found in many regions of the Russian Federation. Soviet peasants were reluctant to increase the area of these crops. The authorities admitted that high-protein crops such as beans and lentils were sometimes difficult to cultivate. By the late 1980s, the area under legumes had increased only slightly (see Table 9.5.).

The problem of the poor state of hayfields and pastures was one of the most difficult to solve. In the 1980s, in the United States, the hay

harvest reached 140 to 150 million tons, while in the USSR it reached only 56 to 70 million tons. In the United States, livestock were supplied with pasturage of 270 to 295 million tons, and in the USSR only 68 to 70 million tons. Both countries had approximately the same livestock inventories. Thus in the Soviet Union, the availability of hay and pasture grass per head of cattle was 2.5 and 4 times less than in the United States (*Pravda*, 1989). In fact, hay production in the USSR remained at the same level as it had been in the Russian Empire at the beginning of the twentieth century (about 50 million tons).

In many regions of the USSR, the shortage of hay supplies was chronic and farmers had to utilize all possible areas for producing hay. A deficit of hay and pasture grass could occur even in an average year. For example, in 1978, which was optimal in terms of weather, the resolution "On additional measures for the fulfillment of harvesting, agricultural products provision, and the production of fodder in 1978" was adopted. The resolution called for the full utilization of valleys, forested areas, areas alongside roads (waysides), and other places for the production of hay (*Pravda*, 1978b). Needless to say, in years with more problematic weather the situation became much worse.⁶

In the forest zone of European Russia, the availability of hay and pasturage had deteriorated by 1980. In this zone there were about 18 million hectares of hayfields and pastures, but more than 7 million hectares (about 40 percent) of them were overgrown with bushes or waterlogged. The small size of grassland plots and their distant location were obstacles to their efficient utilization (*Sovetskaya Rossiia*, 1977). The reduction of the area of grassland went along with rural depopulation and the amalgamation of collective farms. In some areas, hayfield areas decreased by one and a half times between 1970 and 1980. Also, yields from grasslands had decreased. Another problem was the distant location of pasturelands from farms in the forest zone. It was impossible to move a herd over 5 to 10 kilometers for grazing. A further problem was the small area of the pastures. They were too small to graze 100 to 150 animals (*Izvestia*, 1981c). The Soviet press also stressed the low quality of the hay. In 1979, only 30 to 35 percent of hay was recognized as of first-class quality (*Trud*, 1979).

In the steppe zone of European Russia, the situation was even worse. A typical sight in the North Caucasus was trucks filled with straw moving to the east of the region. These trucks transported straw over 100 kilometers throughout the whole winter and sometimes into the

spring. The straw cost from 100 to 150 rubles. Vast areas of hayfields had been ploughed in the course of the virgin lands campaign. Pastureland had also been ploughed, although traditionally the herd was fed on grass from early spring to late autumn. Attempts to restore grassland provided little benefit. Meanwhile, the number of livestock had grown and the gap between feed production and demand had widened dramatically. In some areas, feed production reached only 30 to 40 percent of demand (*Sovetskaya Rossiya*, 1987).

It is true that the Soviet Union launched special programs for the radical improvement of hayfield and pastureland, but they did not prove successful. In 1974, a program for the non-black earth (forest) zone, including land reclamation projects (irrigation and drainage) as well as high rates of fertilizer application to improve hayfield and pastures, was adopted. The Food Program adopted in 1982 was designed to “radically improve” 21 million hectares of hayfields and pastures (out of a total of 300 million hectares) between 1984 and 1990 (about 3.5 million hectares a year) (*Izvestia*, 1983a). However, plans for hayfield improvement were not met, year after year. For example, in 1982 the Ministry for Improvement and Water Resources of the RSFSR failed to fulfill its plan in every province of the republic. In the non-black earth zone the improvement plan for hayfields and pastures was only 25 percent fulfilled. Local bodies of the Ministry were extremely reluctant to help with hayfields and pastures because these works were unprofitable for them (*Sovetskaya Rossiya*, 1983).

Table 9.6. shows that during the 1980s the diet of Soviet livestock hardly improved. In the Russian Federation, the consumption of hay grew by 15 percent following the decreases in 1975 to 1980. However, this growth was much less than the 50 percent increase planned for 1981 to 1985. According to Soviet norms, hay consumption per head of cattle should have been 1.1 tons of feed per unit per year (three kilograms per day), but the actual figure was half that (*Sovetskaya Rossiya*, 1978). The consumption of succulent fodder increased by 32 percent rather than the planned 80 percent (*Ekonomicheskaya gazeta*, 1978). The growth of hay and root crop production was achieved due to an increase of 20 percent in the sown area under perennial grass and of 41 percent in the area used for roots. A bleak situation emerged in the production of pasturage, which had been in steady decline for many decades. Between 1975 and 1987, the consumption of pasturage fell by 25 percent. According to the food program, during the eleventh five-year plan period (1981–1985) total

Table 9.6. Fodder consumption per head of livestock unit in the Russian Federation (tons per year)

Year	1975	1980	1981	1985	1986	1987
Pasture grass	2.63	2.20	2.18	2.10	2.05	1.97
Coarse	1.63	1.41	1.48	1.54	1.71	1.62
Hay	0.55	0.47	0.52	0.57	0.62	0.58
Succulent	2.99	3.19	3.11	3.86	3.81	3.70
Incl. Silage	1.31	1.38	1.45	1.83	1.79	1.66
Concentrate	0.87	0.96	0.95	0.95	0.98	0.99
Feed per head (centners of feed units)	24.5	24.9	24.6	26.6	27.1	27.2

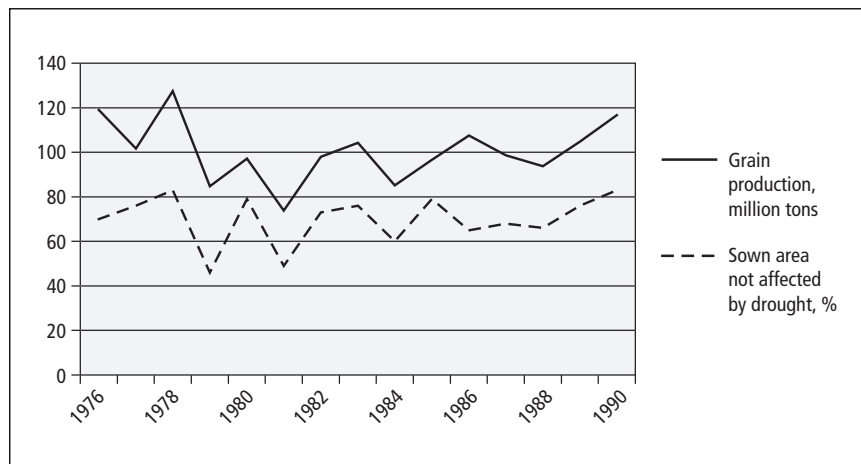
Source: calculated on the basis of *Narodnoe Khozyastvo v RSFSR v 1987*, 1988.

fodder consumption should have increased by 25 percent. The actual total growth in fodder consumption was only 11 percent between 1981 and 1985 and 4 percent in the second half of the 1980s. The average fodder consumption per head of standard livestock was 26 to 27 centners of feed units, while the norm was established at 40 to 45 centners. On the whole, improvements in livestock feeding in terms of quality of diet and quantity of grain fed were negligible in the Soviet Union. This meant that the problem of the excessive consumption of grain per unit of livestock production was still unresolved. There was no change in grain consumption per head, and, as the total number of livestock had increased, the total amount of grain fed to the livestock caused excessive pressure on the grain production sector where no increase in productivity was seen.

9.2. Weather variations and agricultural production

There was a remarkable imbalance between feed grain production and demand in the Soviet Union in the 1980s. The feed grain shortage was 7 percent in the late 1970s and as high as 28 percent by the end of the 1980s. The reason was simple: average feed grain demand had increased by 30 percent (from 120 to 160 million tons) while Soviet grain harvests no longer showed even a slight increase. To what extent should the weather be blamed for this stagnation in grain production? If weather conditions were more favorable in the 1980s, would it have helped grain production to meet demand?

Figure 9.4. Grain production and intensity of drought in the RSFSR, 1976–1990



Source: for grain production *Sel'skoe khozyastvo v Rossii*, 2000.

Some Western experts believe that the weather continued to be the dominant variable in Soviet agricultural production in this period. In 1978, Severin and Carey predicted that relatively favorable weather in the late 1970s would be reversed in the next years, bringing many problems for Soviet agriculture (1978). This did, indeed, happen. The second half of the 1970s was relatively good but the first half of the 1980s seemed to be one of the worst periods in terms of climate (Figure 9.4.). Major problems for Soviet agriculture were caused by large-scale droughts. Figure 9.4. shows that the fluctuation in grain production evidently correlated with the proportion of crop area affected by drought (this area is determined by the Hydrothermal Coefficient of Seljaninov). All the major drops in grain production in 1979, 1981, and 1984 correspond to the occurrence of severe droughts. Those of 1979 and 1981 followed that of 1975 in terms of intensity, while the drought of 1984 was comparable with that of 1972. One specific feature of the climate conditions of the period was the waves of cold air that often followed a drought, as happened in 1980. The occurrence of three consecutive years of poor weather (as observed in 1979 to 1981) was a rare event even for the USSR, and the decline in the grain harvest between 1978 and 1985 should certainly be attributed to the exceptionally poor weather.

The situation was quite different in the second half of the 1980s. Modest grain harvests in 1985 to 1990 cannot be explained by weather

Table 9.7. The main parameters of agricultural production in the USSR, 1976–1990

Year	Livestock inventory			Livestock production		Feed supply		
	Number of cattle (millions)	Pigs (millions)	Sheep and goats (millions)	Meat (millions of tons) (centners of tons)	Milk (millions of tons) (millions of tons)	Feed per head (millions)	Concentrated feed	Total feed (in oat equivalent)
1976	111.0	57.9	734.4	13.6	89.7	25.5	117.4	365.0
1977	110.3	63.1	796.0	14.7	94.9	27.3	143.0	403.0
1978	112.7	70.5	882.3	15.5	94.7	26.9	145.9	409.6
1979	114.1	73.5	946.9	15.4	93.2	26.1	146.6	403.3
1980	115.1	73.9	980.9	15.1	90.9	25.7	143.9	398.1
1981	115.1	73.4	1,032.4	15.2	88.9	25.5	141.2	397.5
1982	115.9	73.3	1,067.5	15.4	91.0	25.6	141.3	402.6
1983	117.2	76.7	1,104.5	16.4	96.5	26.4	142.8	424.0
1984	119.6	78.7	1,126.1	17.0	97.9	26.5	143.5	431.1
1985	121.0	77.9	1,143.0	17.1	98.6	27.0	147.4	436.1
1986	120.9	77.8	1,165.5	18.0	102.2	27.3	144.8	444.2
1987	121.1	79.5	1,174.2	18.9	103.8	27.5	149.5	444.7
1988	120.6	77.4	1,175.1	19.7	106.9	27.5	154.9	445.0
1989	119.6	78.1	1,199.5	20.1	108.5	28.3	157.6	450.8
1990	118.4	79.0	1,213.9	20.0	108.4	29.0	156.4	458.2

Sources: Severin, 1984.

conditions. In general, the weather at the end of the 1980s was very favorable. However, the planned growth in grain production was not achieved. Instead it stayed at a lower level than in the late 1970s, even though the weather was more problematic then. The conclusion must be that it was not the weather but the technical shortcomings and mismanagement that accompanied Gorbachev's reforms that were responsible for the stagnation in Soviet agriculture at the end of the 1980s.

Our analysis is made problematic by the lack of official statistics for grain production at regional level for the period 1975 to 1985. For these years, the Soviet Union published only average figures for grain harvests in the regions (for the corresponding plan periods), and it resumed the publication of annual statistics only from 1985. On the other hand, the available figures provide the possibility for tracing the impact of crop failures on the livestock sector for most years. The available data allow a reasonably detailed picture to be drawn (Table 9.7.).

In the three years from 1976 to 1978, average harvests were the highest in the post-war period of the USSR. However, some problems

Table 9.8. USSR grain supply and utilization (millions of tons)

Marketing year, June–July	Production	Imports from the US	Net imports from rest of world	Total imports	Food	Utilization Feed	Total	Change in stocks
1970/71	187.00	-	7.00	7.00	45.00	88.00	187	7
1971/72	181.00	2.90	-1.60	1.30	45.00	93.00	180	2
1972/73	168.00	13.70	7.30	21.00	45.00	98.00	187	2
1973/74	223.00	7.90	-2.70	5.20	45.00	105.00	214	14
1974/75	196.00	2.30	-1.90	0.40	45.00	107.00	206	-10
1975/76	140.00	13.90	11.50	25.40	45.00	89.00	180	-14
1976/77	224.00	7.40	0.30	7.70	45.00	112.00	221	11
1977/78	196.00	12.50	4.10	15.60	45.00	122.00	228	-16
1978/79	237.00	11.20	1.60	12.60	46.00	125.00	231	19
1979/80	179.00	15.20	15.00	30.20	46.00	126.00	225	-16
1980/81	189	8.00	25.00	34.00	47.00	122.00	225.00	-2

Source: *Foreign Agricultural Circular* of USDA, 1976

caused by the weather were reported. For example, *Pravda* (1977) wrote that harvesting in 1976 had taken place in very complicated weather conditions, although it gave no details. Some decline in milk production was an indication of these weather problems, while the sharp fall in meat production resulted from massive slaughtering in 1975 (Table 9.7.). Despite the record harvest of 1976, the USSR had to import 7 million tons of grain. As a result of a lower demand for feed grain there should have been an excess amount of grain that could help replenish the state grain reserves (Table 9.8.).

In 1977, the decline in grain production in the USSR was certainly caused by poor weather, the main feature of which was the prevalence of unusual cold throughout the whole year with the single exception of autumn. The cold weather was associated with a very stable zone of high atmospheric pressure in the Polar region. In the high latitudes of Europe, east winds prevailed. The Arctic anticyclone spread over a vast territory to the east of the Urals and blocked cyclones moving from the west over European Russia. During the summer, in central regions of European Russia the weather was dominated by an influx of these numerous cyclones, bringing cold and rain. During the year, precipitation was excessive in most regions of European Russia. In July and August, in southern Ukraine, precipitation was 300 and 200 percent of

the norm. These figures were the highest ever recorded for this area (*Bulletin of WMO*, 1978). The wet and cold weather affected crops in European Russia. In the non-black earth zone, a rainy and cold summer resulted in a poor fodder crop (*Sovetskaya Rossia*, 1977). Some Western sources also reported the poor growth of fodder crops in 1977 (“Lean times ahead...”, 1980).

In the Siberian part of the USSR, the winter of 1977 was extremely cold (4 to 9 degrees below the norm) because of the vast Arctic anticyclone. This cold weather was followed by an unusually warm spring, with temperatures 4 to 8 degrees above the norm. The dry warm weather prevailed during the spring and summer and this resulted in a reduction of the crops in the steppe zone of Western Siberia. A warning was issued about the high risk of forest fires in the region of Lake Baikal in September (*Bulletin of WMO*, 1978). The Soviet geographer U. L. Rauner included 1977 in his list of years of drought, and pointed out that the drought was located in the Siberian part of the USSR (1982).

In 1977, grain production fell to 12.5 percent below the level of 1976. The USSR imported more than 15 million tons of grain. An additional 16 million tons were found from the state grain stocks. However, livestock inventories were still below those of 1974, while meat production only slightly increased above the 1974 level and was lower than in 1975. The country was forced to turn to the world market for unprecedented levels of meat imports that reached 616,900 tons.

In 1978, the USSR reported a record grain harvest of 237 million tons. The weather was wetter than usual. In European Russia during the whole growing season temperatures were 2 to 4 degrees lower than the norm, which made the maturing process longer than usual. In spring, precipitation was 150 to 250 percent above the norm in the agricultural zone of European Russia. In Siberia, the weather was reported to be mild (*Bulletin of WMO*, 1979).

The autumn of 1978 was difficult for the western regions of European Russia. The Soviet press reported a fodder shortage in the Baltic republics during the winter of 1978–1979 caused by an unfavorable autumn. In Estonia, less than half of the planned quantity of fodder was produced. The deputy chairman of the Latvian Council of Ministers blamed the difficulties of the republic largely on bad weather in 1978, especially at harvest time, which caused substantial losses of fodder, grain, and potatoes (*Sovetskaya Latvia*, 1979). One Western paper mentioned the hard harvest time, noting, however, that the grain harvest was

expected to be well above the average for recent years and possibly to hit a record level (*Baltimore Sun*, 1978). It is indeed worth stressing that the record harvest of 1978 was obtained despite problematic weather conditions.

In 1978, meat production rebounded to the 1975 level and hit a record high of 15.5 million tons. The pig inventories jumped by 12 percent and cattle increased by 2.3 percent in one year. However, milk production went down compared with 1977, perhaps due to adverse weather in the western regions of the USSR. The considerable increase in livestock numbers led to less feed being available per unit of livestock (see Table 9.7.). Although the grain harvest was sufficient to meet the domestic demand, the USSR purchased more than 15 million tons of grain in Western countries, apparently in order to refill the grain reserves (Table 9.8.). The good harvest allowed the Soviet Union to cut its meat purchases on the world market in order to save foreign currency (Reuter, 1978). Only 184,000 tons of meat were ordered from traditional suppliers including New Zealand and Australia.

The major crisis in Soviet agriculture began in 1979. In that year the weather was very unstable in relation to temperature and moisture. The problems started with very cold spells in both the European and Asiatic parts of the USSR in January. The Siberian anticyclone caused a record low temperature in Western Siberia. In the western part of European Russia in January temperatures were 2 to 5 degrees below normal (*Bulletin of WMO*, 1980). Severe cold and snowdrifts were reported in many parts of the country creating many difficulties for workers on livestock units in kolkhozes and sovkhoses. Soviet officials called for major efforts to be directed towards ensuring that the production of livestock increased even in these conditions and that numbers were maintained ("USSR national affairs..."; 1979).

Fodder shortages in the Baltic republics were attributed to severe frosts in December and January, which additionally hampered the transportation of fodder from other republics. As a consequence, in Estonia in January, 17 percent less meat and 13 percent less milk was produced than in January 1978 (Radio Tallinn, 1979a). This drop in livestock production was detailed by a Western paper in the following way. The trouble began with the crop failure of 1978. Cattle breeding and animal husbandry suffered most, but the Estonian kolkhozes and sovkhoses were not permitted to reduce their herds in the autumn, as they had suggested, in order to manage on their own fodder supplies. They were told

that extra fodder was unobtainable and they received cash instead (*Daily Telegraph*, 1979b).

In the winter of 1979, very unstable weather was observed in the southern Ukraine and North Caucasus. In February, warm weather brought unusually high temperatures (from +12 to +20 degrees). Then this warm weather was replaced by a sharp cold spell, with temperatures falling below –15 degrees. These frosts damaged winter crops and gardens (*Bulletin of WMO*, 1980).

April was still cold in European Russia, especially in southern areas, but May turned out to be surprisingly warm, with average temperatures 3 to 6 degrees higher than normal. In Moscow it was the warmest ever recorded. The spring heat and the large amounts of snow that had accumulated during the wet winter resulted in severe flooding on numerous rivers. A dramatic situation was reported from the western part of European Russia. In Belarus, exceptionally large snowfalls in the winter resulted in many rivers bursting their banks when the spring thaw came, and at the end of April immense areas of agricultural land were flooded. Winter grain crops were washed away, spring sowing and reseeding were delayed, and the bulk of field work had to be carried out in a very short time (“Masherov expresses alarm...”, 1979).

Then the weather situation reversed again. In June, exceptionally dry and warm weather settled over southern areas. In May and June precipitation reached only 10 to 20 percent of the norm (such deficits were observed once every 20 years). Thus a spring-summer drought affected the main agricultural zone of Russia (*Bulletin of WMO*, 1980). Dry weather also affected central and western regions. In June, in Belarus, drought set in following the spring flooding, with virtually no rain for a month, which resulted in the republic facing a critical shortage of animal feed. Later, the first secretary of Belarus, Masherov, revealed that “in the exceptionally difficult circumstances of the 1979 drought, Belarus has fallen 40 percent short in grain production” and he warned that, with continuing fodder shortages, the coming winter would be just as hard for livestock breeders as the summer drought (“Local leaders detail...”, 1980). The Baltic republics also complained about the summer drought, and the Volga-Vyatka region faced drought in May and June.

In July, the weather radically changed again. In northern and eastern provinces, cold and rainy weather affected vegetables. Record low temperatures were already observed in the Baltic, Belarus and central provinces. In the central provinces precipitation was 200 to 300 percent

above normal and resulted in damage to the crops (*Bulletin of WMO*, 1980). The late summer and autumn were very rainy, too.

At the beginning of October, early frosts occurred in Moldavia and the Ukraine, and some crops were affected. In October, Soviet papers reported early frosts which were responsible for shortages of vegetables and fruit in many regions of the USSR (*Sel'skaya Zhizn*, 1979). Thousands of gardens, both on collective farms and private plots, were hit by cold snaps that ruined fruit and vegetables. It was noted that many fruits and vegetables ripen at the same time and must be harvested at the same time, thus creating a huge demand for trucks, leading to shortages.

Weather conditions in the eastern part of the USSR looked much better than in European Russia. Western Siberia and Kazakhstan enjoyed stable good weather during the whole year. Western experts wrote that sheep farming benefited from the unusually favorable weather in 1979 in Western and Central Siberia, Kazakhstan, and most of Central Asia (Wadekin, 1980a).

Due to the very capricious weather of 1979, the grain harvest dropped by more than 25 percent from the levels achieved between 1976 and 1980. Soviet grain production that year was only 179 million metric tons, a five-year low. According to official statistics, fodder production was about half of that planned and 5 million tons less than in 1978 (*Sovetskaya Rossiya*, 1979). Following the poor grain harvest and the mediocre fodder crop in 1979, Western observers did not rule out the possibility of distress slaughtering in the winter of 1979–1980. However, a comparison of the numbers of beef cattle, pigs, sheep, and fowl slaughtered in 1978 and 1979 reveals only a very small difference between the figures in the two years.

The Soviet Union had evidently applied a new strategy for surviving in poor years. For example, in 1972 and 1975, years of severe drought, the USSR slaughtered large numbers of animals because of fodder shortages. Distress slaughtering in those years increased the meat supply temporarily but caused considerable drops in meat production in the following years. A further cost of this strategy was the number of years it took to rebuild the herd. The new Soviet strategy reflected a determination to avoid a repetition of the setback of 1975 at any cost. The Soviet Union tried to keep some growth of the herd with a view to further expansion in a normal year. Large annual imports of feed grain from Western countries, and the state grain reserve, were vital elements of the new strategy.

Grain imports were partly limited for political reasons. Initially, the Soviet Union intended to import about 37.5 million tons of grain during June and July 1979–1980—two and a half times more than in 1978–1979. In January 1980, after Soviet troops went into Afghanistan, the United States introduced an embargo on sales of American grain and other products to the Soviet Union. Because of the embargo, grain exports from the United States to the USSR were limited to 15.2 million tons. “There is no way the Soviet Union can get through 1980 without slaughtering some of its carefully built up herds”, one Western expert said, referring to the effects of the embargo (Philips, 1980). However, the embargo failed because the USSR found other grain exporters. The Soviet Union offered price premiums to Argentina, which then directed its export flow away from Western Europe in favor of the USSR. According to Western estimates, the total grain imports of the USSR somehow reached 30.5 million tons. The Soviets were also carrying out one of their largest stock drain-downs. It was estimated that about 46 million tons of additional feed grain were available for the Soviet Union.

About 126 million tons of feed grain allowed the USSR to keep its large numbers of livestock. The cost was a decline in livestock productivity, as less fodder per head was available (see Table 9.7.). The average weight of cattle slaughtered was 382 kilograms in January/February 1978, and 372 kilograms in January/February 1979; for pigs the respective figures were 105 and 101 kilograms (Kronner, 1980). These figures indicate that growth in meat production could be achieved only by the excessive slaughtering of animals, which the Soviet Union wanted to avoid. Some decline in meat and dairy production seemed to be more acceptable to the Soviet Union. The decline in meat production (by 100,000 tons) was compensated by meat imports, which reached 317,000 tons. Soviet butter production in 1979 was estimated to have decreased by 1.5 percent from the 1978 level to 1.45 million tons. This decline was more than made up for by purchases from the European Community, reportedly at a level of 141,000 tons.

The weather in the following year, 1980, brought no relief for Soviet farmers. In the whole of Europe cold and wet weather dominated. The weather at first appeared promising for a bumper grain harvest in the Soviet Union. The winter had lingered longer than usual while the snow cover protected the spring grain from frost and acted as a form of irrigation. If it melted more slowly than usual, it would not flood the fields. Unfortunately, the weather turned in the other direction. The

cold and cloudy weather lasted too long and was still dominant in late spring and early summer. In some regions, extensive crop damage was caused by the returning spring frosts. In the Ukraine, late frosts were observed in May for the first time in 25 years.

In most regions of European Russia, because of the cold and rainy weather, sowing was carried out very late, and thus crops matured two weeks later than usual (*Bulletin of WMO*, 1981). One Western paper, quoting figures issued by the Soviet statistical board for the period up to mid-July, placed the harvest so far at just over 8 million hectares, a little more than half the area harvested at the same time the previous year (*Washington Post*, 1980).

Throughout the whole summer the western part of European Russia suffered from continuous rain, amounting to three times the normal amount of precipitation. The rainy summer left large areas flooded outside the Black Earth zone of European Russia. At the same time, good wheat and barley crops in the Don river basin were flattened by high winds and a Ukrainian paper that week mentioned serious hail damage.

In August and September, continuing cloudbursts and cold spells greatly complicated harvesting and winter-crop sowing. In the Baltic republics, Belarus and the western part of the Ukraine, precipitation doubled from the norm for October. In early November, a wave of cold arctic air invaded European Russia from the east (*Bulletin of WMO*, 1981). Soviet experts described such weather as extremely unfavorable for potato crops. The Soviet population was indirectly warned that there could be a potato shortage caused by the cold, wet summer in western and Central Russia (Reuter, 1980a).

In Western Siberia and Kazakhstan, the weather was far more favorable. After a cold winter, temperatures were higher than usual from April onwards, and summer and autumn were mild.

In 1980, the Soviet Union harvested 189 million tons of grain, 8 percent below the average for the five-year period. Grain imports in the USSR reached the record level of 34 million tons, presumably at higher prices than in any previous year because of crop failures in some other major grain-producing countries (Reuter, 1980b). Only 2 million tons were withdrawn from the exhausted state reserves (Table 9.8.). In total, the feed grain reserve was 2.5 million tons lower than in 1979. Less non-grain fodder had been produced despite a large propaganda campaign. Among other slogans, the Communist Party Central Committee called for the saving of fodder resources at the 7 November anniversary

of the socialist revolution (*Pravda*, 1980b). The Soviet press optimistically reported that farms were heading into the winter with greater supplies of raw and succulent feed than they had possessed at the onset of the previous winter. *Izvestia* (1980) wrote that many regions faced very unfavorable weather conditions but that many collectives had already learnt how to minimize the losses caused by poor weather. As one Western expert put it, "Soviet kolkhozniks and sovkhozniks had been ordered to grow and stockpile fodder this summer as if their lives depended on it" (Whitley, 1980a). *Pravda* claimed that the year's reserve of forage and hay exceeded the previous year's reserves almost everywhere. This was not true: official Soviet statistics reveal that fodder reserves were 2.5 million tons lower (in oat equivalent) than in 1979 (Table 9.7.). Western experts also wrote that the quality of the feed, in particular its nutrient content, was expected to be lower than that of the feed produced during the dry summer of 1979, due to rainy weather during the 1980 harvest season ("A preliminary look at Soviet agriculture...," 1980).

However, the USSR again successfully avoided mass distress slaughtering. Official figures show that only pig numbers decreased by 0.5 million heads, while cattle numbers remained unchanged and the number of poultry, sheep, and goats even increased. The distress slaughtering of 0.9 million pigs and 0.1 million cattle took place only in January and February, apparently in an effort to keep herd sizes at manageable levels, given current feed reserves. Soviet figures indicate the production of 2.7 million metric tons of beef, pork, lamb, goat meat, and poultry in the first two months of that year, a jump of 13 percent from 2.4 million tons in the same period the previous year (Whitley, 1980a). By making a decision to slaughter animals in January and February, the Soviet Union seemed to have been hoping that the new harvest would allow the herd to recover within the year.

There was a continuing tendency towards a decline in livestock productivity. The average slaughter weight of cattle between January and April was only 364 kilograms, compared with 372 kilograms in the same period the previous year. The average slaughter weight for pigs was 99 kilograms in the first four months of 1980, compared with 103 kilograms in the same period of 1979. The purchase of milk by the state declined, reflecting a corresponding fall in milk productivity per cow (as cow inventories had not changed): in January/February 1978, the figure was 16 million tons; in 1979 it was 15.5 million tons; and in 1980 it stood at 14.5 million tons (Kronner, 1980).

Because of lower livestock productivity, slaughtering on the same scale as in 1978 or 1979 led to smaller meat output. The overall decline in meat production in 1980 reached 2 percent, and that of milk production around 2.5 percent. However, official statistics showed a growth in meat and milk sales in the summer. Western experts suggested that the state reserves and imported food had been used to meet demand (Kronner, 1980). Meat imports were higher than 500,000 tons in 1980. However, the whole picture was more complicated, and after a considerable decline in livestock production in the summer (up to 15 percent) the situation improved in the autumn when kolkhozes and sovkhoses supposedly purchased private livestock on a large scale.⁷ In total, the country produced 15.1 million tons of meat, and the massive imports meant that the official goal for meat production of 15.7 million tons was achieved (but was still a long way from the initial plan target of 17.3 million tons). Imports allowed the Soviet Union to make ample supplies of meat available for the 1980 summer Olympics.

A large-scale drought the following year (1981) led to the lowest harvests in three years of crop failures. At the beginning of the year the weather was warm, with temperatures exceeding the norm by 5 to 8 degrees. For example, on the Black Sea coast fruit trees were blossoming at the end of January (*Bulletin of WMO*, 1982). The winter had been mild in central provinces, with little snow.

This mild weather aroused some hopes of a good new harvest. In May, and even in June, both Western and Soviet economists were predicting a bumper crop, initially estimated by the USDA at about 210 million metric tons—although this would have been short of the target of 236 million metric tons for 1981. The basis for this early optimism was the good progress of the winter grain crop, which had benefited from mild weather conditions and adequate rainfall during the spring (Journal of Commerce, 1981a). Unfortunately, adverse weather in July and August, particularly the combination of prolonged dry spells, flash flooding, and high winds in different parts of the grain-producing area, which damaged the spring crops, caused Western experts to revise their initial estimates downwards from a projected 210 million tons to 185 million tons (“Ukrainian writer appeals...”, 1981).

That summer, some of the hottest and driest weather this century withered the grain crops from Belarus in the northwest to eastern Ukraine. The drought belonged to the worst central type and affected both production and consumption zones (Figure 9.5.). Forest fires are typical

of this type. Indeed, numerous fires ignited by careless campers and other travelers caused serious damage to grain fields (*Baltimore Sun*, 1981).

Different regions of European Russia complained about the exhausting heat. In the Central Black Earth region (Belgorod province), the dry spring and summer damaged crops (*Pravda*, 1981). In Moscow, the temperature in mid-June reached 34.9 degrees. Anticipating a fodder shortage in the Moscow region, Soviet officials encouraged hay cutting everywhere, including waysides, ravines, and forests (*Izvestia*, 1981b). It seemed that the dry weather would continue for ever, *Izvestia* reported. In many districts of Ryazan province no rain was observed between May and mid-August.

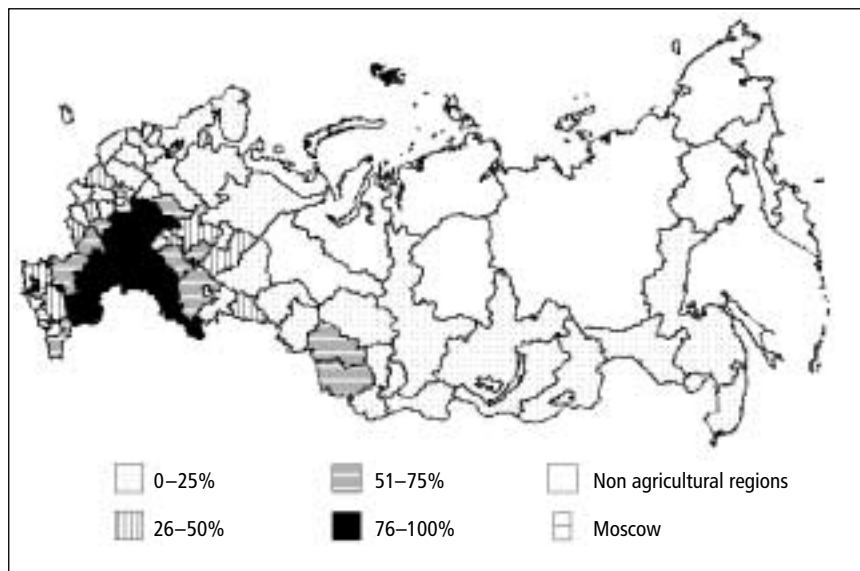
In the Ukraine and the Volga basin, extremely dry weather prevailed from May to August. Precipitation was 25 to 50 percent below the norm. In Kazan (Middle Volga), two and a half months of dry weather devastated the crops (*Chicago Tribune*, 1981). In many agricultural regions the record heat in July and early August was coupled with dry, searing winds with scant rain and numerous fires. The farming newspaper *Sel'skaya Zhizn* reported that farmers "greeted the weather with disappointment and surprise. After long, dry days, high winds and showers flattened the ripening wheat in the southern areas of the USSR. This made it difficult to harvest without losses (*Journal of Commerce*, 1981b). "What we need is rain every few days without high wind", said one source, "and what we have had is dry, warm and windy weather, which tends to scorch the grain and dry it out. It accelerates the ripening process and diminishes protein, reducing quality."

The harvest was also poor in some eastern areas of the country. It was reported that grain crops in wide areas of southern Siberia's Altai region had been left thin and stunted by the hot weather (*Los Angeles Times*, 1981b).

In European Russia, the dry summer was followed by a cold and rainy autumn. In the harvesting season, temperatures fell below the average by 4 to 6 degrees. Between 7 and 20 September, the amount of precipitation was six times the norm, creating very unfavorable conditions during harvesting (*Bulletin of WMO*, 1982).

At that time, uncertainty existed about the size of the 1981 grain harvest. According to the USDA's latest estimate, the harvest would be no greater than 165 million tons. The Soviet year-end report released in 1981 contains no figures for the grain harvest. The lowest figure for grain production published at that time was 155 million tons (*Times*, 1988).

Figure 9.5. Area affected by drought in 1981



Only in 1985 did the Soviet Union release a figure as low as 158.2 million tons. In addition, very poor potato, sunflower, and sugar beet harvests were reported in 1981. Agricultural experts concluded that fodder yields, too, had not only been below expectations but had been even lower than in the preceding year.

At 158.2 million tons, the grain harvest meant that an additional 50 to 60 million tons—at a cost in current prices of some billions of dollars—had to be imported from the West to make up the shortfall. It was not possible to make up such a feed grain deficit entirely with imports, although the lifting of the embargo by Ronald Reagan in spring 1981 gave the Soviet Union greater flexibility in the purchase of feed grain abroad. There was a bottleneck for imports associated with unloading and transportation capacities in the USSR. According to the USDA's estimate, the Soviet Union imported 43 million tons of grain in 1981–1982 (*Chicago Tribune*, 1982a). It is also unlikely that the Soviet Union had much grain to withdraw from the state reserves. Over the previous nine years, according to US estimates, the Soviet Union had withdrawn 14 million tons more than they had added to the grain reserve (*Los Angeles Times*, 1981b).

The situation in the Soviet livestock industry was more critical than in any previous year. Despite the feed shortages, farmers somehow man-

aged to avoid the excessive culling of their livestock herds in 1981. In Moscow province, one farm director said: "... we followed a firm line to maintain the size of the herd, regardless of the deficit of fodder. We did it even in 1975. This year, which has also been extremely dry, we followed this approach too" (*Izvestia*, 1981c). One Western agricultural expert acknowledged: "Given the amount of feed, they've done an impressive job keeping the herd numbers up. They're obviously determined not to let the herds diminish, because of the time and expense it would take to bring them back up to size again" (*Chicago Tribune*, 1982a).

Surprisingly, livestock production even slightly increased in 1980–1981. According to year-end statistics for 1981, meat production had rebounded to 15.2 million tons from 15.1 million tons in 1980. Western experts suspected the figure for 1981 was inflated and would be revised downward by at least 100,000 tons (*ibid.*). Soviet statistics, however, revealed that the gain had been achieved only due to an increase in poultry meat production, which grew from 2.1 to 2.3 million tons (*Narodnoe khozyastvo v RSFSR v 1981*, 1982). This branch of animal production was more tightly concentrated in state complexes which operated in an industrial fashion and which had been preferentially supplied with feed from the mixed fodder industry. Thus in 1981 it had served as a brake against a sharp overall drop in meat production.

The milk production picture was gloomier. Despite an increase in the number of cows, total milk production declined (see Table 9.7.). The total milk production was 2.2 percent below the 1980 level, while the cow herd had grown by 0.3 million. This meant that productivity per Soviet cow had undergone a serious decline. In 1977, each cow produced about 2.294 kilograms of milk; by 1980 the figure was down to 2.143; and for 1981, the figure was 2.050 kilograms (in the existing purchase price system, Soviet milk farms made a profit if the per cow milk production exceeded 3 kilograms). In the case of cows, it was not reasonable to keep numbers up at any cost. In the West, once a cow's productivity fell to an extent that could not be recovered, farmers would cull it and start raising a new one on better feed (*Chicago Tribune*, 1982a).

In 1982, the recession in agriculture was still not over. The weather in 1982 was problematic because of waves of cold that arrived in different seasons. The end of the year brought many problems to the whole of Europe because of severe frosts. As described in a bulletin of the World Meteorological Organization, severe frosts in December paralyzed life in most countries of Europe (*Bulletin of WMO*, 1982). In the

first month of the winter, sharp cold and strong storms were observed in European Russia, too. Such weather damaged winter crops because the thin snow cover gave little protection from frost (*Bulletin of WMO*, 1983). One Western paper mentions the bitter cold weather that blew in on New Year's Day, and how some problems with snow cover existed in the more southerly regions of Russia (*Chicago Tribune*, 1982a). It was also reported that the early summer in European Russia was unusually cold, but the second half of the year was dry and warm in the European part of the country. The weather in Siberia was again milder than in European Russia.

Although the Soviet news agency TASS declared that grain production had "noticeably increased" from 1981, the results for 1982 were not published by the Soviet statistical board, clearly indicating that the harvest was below expectations. The target for 1982 was 240 million tons, but Western experts believed that the harvest might not have reached 190 million tons, and could have been lower. Later, the Soviet statistical board issued a figure of 186.8 million tons. Thus the feed grain shortage probably reached critical levels (at presumably more than 30 percent). In autumn, a feed grain shortage was reported in many regions. Western diplomats said that a poor harvest that year could encourage the feeding of bread to animals. The US agricultural council in Moscow reported some indications that the Soviet Union was disappointed with the low quality of hay and silage caused by excessively cold and rainy weather (*Journal of Commerce*, 1982). It was predicted that the Soviet Union would have to import as much as 40 million tons or more to make up the shortfall in its crop and refill its depleted grain reserves (*Guardian*, 1982).

The Soviet authorities could no longer lay the blame for the failure of Soviet agriculture exclusively on the weather. In a speech to the Central Committee in May, President Brezhnev acknowledged that the results he had hoped for had not been achieved. In the past he had blamed poor weather rather than inefficiency for the Soviet Union's poor harvests. However, with the Soviet Union facing its fourth bad harvest in a row, the Soviet leader blamed the system rather than the weather for the failures in Soviet farming. The ruling Politburo ended 1982 with a December appeal to farm workers to complete the spring sowing on time and a warning to farm managers they would be held "personally responsible" for this task (Smale, 1983).

This criticism had a reasonable basis. It seems that while the Soviet Union had learned to cope with feed shortage in poor years, the problem of great losses of potential harvest in a normal year became a challenge. The relatively low harvest in the following, good weather conditions in 1983 confirmed this. That year the USSR enjoyed extremely mild weather in such major growing winter-crop areas as the eastern Ukraine, the Lower Volga valley, and the Northern Caucasus. However, the grain harvest in the Russian Federation was only 192.2 million tons, less than that in the poor year of 1977. Western experts wrote that Soviet farmers had had a late start sowing the winter grain crop in the previous fall and had thus probably missed their target of planting 36.4 to 37.4 million hectares (90 to 92.5 million acres). Western estimates were that they sowed only 33.4 million hectares (82.5 million acres). This is important because the wheat crop is high yielding. In addition, Soviet farmers apparently had a shortage of seed for spring sowing. According to the Soviet press, Russian farmers had less than 75 percent of the seed they needed, and this situation was “unsatisfactory and alarming” (*Wall Street Journal*, 1983).

The US agricultural department had estimated that Soviet grain imports in 1983 would be the lowest for four years (*ibid.*). However, it was reported in 1983 that a new trade agreement had been signed between the United States and the USSR. The agreement obliged the USSR to purchase annually no less than 9 million tons of American wheat, maize, and soy-beans over five years, at a cost of 10 billion dollars. According to another agreement, the USSR was obliged to purchase no less than 5 million tons of grain from Argentina over five years (“Food supply in the USSR...”, 1984).

The weather in 1984 was extreme throughout Europe. In various European countries many new records for precipitation and temperature were registered. In European Russia, average temperatures in January and February were above the norm. In the spring months, too, temperatures were four to six degrees higher than usual. At the same time, most of European Russia experienced limited precipitation. Water levels in most rivers and reservoirs fell by 30 to 50 percent. The same picture was observed in Western Siberia, where the first half of the year was dry and levels in many rivers were low. Autumn was also dry (*Bulletin of WMO*, 1985).

The hot weather was accompanied by *sukhovei*, and in June there was a severe dust storm in the North Caucasus. Because of a similar

dust storm in Rostov oblast, about 800,000 hectares of winter wheat crop were destroyed and had to be replanted. According to one Soviet paper, the wind eroded an estimated 297 tons of soil from each hectare of ploughed field, but only 69 tons from fields where non-moldboard tillage had been used, clearly advocating the latter agricultural technique (*Sovetskaya Rossia*, 1986a).

During the harvesting period in 1984, the Ukraine, like many other regions of the USSR, suffered unusually adverse weather conditions. Heavy rainfall reduced both the quantity and quality of crops in both the western and central provinces. This was followed by frosts that caused further damage (*New York Times*, 1984). Another paper wrote that, once again, the Soviet Union was facing a dismal harvest. Reports of a disappointing wheat crop emerged from the Ukraine—a drop of 25 million tons from the previous year. From the southern Soviet republics came news that the fruit and vegetable harvest was also disappointing (*Christian Science Monitor*, 1984).

The Soviet government did not publish grain production figures itself, probably because these figures were embarrassing for the Kremlin leadership. Later, Soviet statistics revealed that the harvest was only 172.6 million tons (*Narodnoe khozyastvo SSSR v 1985, 1986*). The problem of feed grain shortages was solved by importing more than 40 million tons of grain, but the shortage of other fodder varieties was more difficult to overcome. The statistics show that the USSR had to slaughter excessive numbers of pigs in order to maintain the 1983 level of meat production. At that time the Soviet Union was still increasing its cattle herd, probably to support a growth in milk production, which was even higher than in 1983. In the autumn of 1984, the Soviet press launched a large-scale propaganda campaign encouraging the saving of grain and its replacement with other feed.⁸

The period between 1985 and 1990 is better documented. The Soviet Union started publishing figures on grain production again at regional level (Table 9.9.). In general, climate conditions were unusually stable during these years. The deviation from average grain harvests for the whole period was 5 percent lower—half that between 1976 and 1980. This stability was evidently attributable to favorable climate conditions. No drought was observed: on the contrary, the period was characterized by the prevalence of very warm and wet weather.

Only local weather anomalies, mainly associated with either frosts or excessively rainy weather, were reported by Soviet and Western

Table 9.9. Grain production in the economic regions of the Russian Federation, 1980–1990 (millions of tons)

Regions	1985	1986	1987	1988	1989	1990
USSR	191.7	210.1	211.4	195.0	196.7	218.0
RSFSR	106.6	118	109.1	103.9	104.8	116.7
Central Black Earth	9.8	10.6	14.1	12.1	13.3	13.1
Volga	19.9	18.5	16.5	17.0	19.3	21.7
N.Caucasus	16.3	21.0	20.8	22.6	24.1	27.9
Urals	19.6	23.8	11.5	12.9	11.6	18.6
W. Siberia	16.7	16.9	16.0	14.4	13.5	10.8
Ukraine	40.5	43.1	50.2	47.4	51.2	51.0
Kazakhstan	24.2	28.3	27.4	22.6	18.8	28.5

Source: *Narodnoe khozyastvo SSSR*, various years.

sources throughout the period. For example, January and February 1985 were very cold elsewhere in Europe, including European Russia (*Bulletin of WMO*, 1986). In the Central Black Earth region in 1985, perennial grass crops were reported to have been damaged by winter frosts (*Sovetskaya Rossia*, 1986b). These frosts were apparently responsible for some decline in winter cereal crops (Table 9.9.). Severe cold weather in January and February was also reported in Kazakhstan. There was a large daily fluctuation in temperature. Severe frosts occurred, with temperatures falling as low as minus 30 degrees. Such temperatures had not been seen in the republic for a long time (*Izvestia*, 1985). As Kazakhstan is a growing area for spring crops, the total harvest was not as badly affected.

These problems did not seem to affect the livestock sector. The policy of the Soviet Union to keep its herds intact in years of drought seemed to be working, since by as early as 1985 the Soviet herd had reached an acceptable size and had then stabilized, allowing improvements to the feeding regime.

Few problems were reported in 1987. Early in the year extremely low temperatures were observed in the Urals and Western Siberia. The rest of the year was also wet and cold, especially in the west of European Russia. Western experts wrote of “very harsh winter conditions” in 1987 (“Soviet economy in trouble”, 1988). The weather mainly brought problems for Soviet farmers in the harvesting period. They blamed a lack of storage in the autumn, which meant that grain was left to rot in the

rain-soaked fields (Reuter, 1987). Although more grain had been harvested, the total fodder reserves in 1987–1988 were lower than in the previous agricultural year.

Throughout the whole of 1988, European Russia enjoyed warmer than usual weather (with the single exception of November). Spring was especially mild, with temperatures three to seven degrees above the norm. However, a large area located to the south of the Moscow region suffered from extremely rainy weather in June and July. Such rainy weather had not been observed there for the previous hundred years and was a likely cause of crop deterioration. It was reported that large areas of cropland were flooded and crops rotted in the fields (*Bulletin of WMO*, 1989). Indeed, in 1988 a relatively low grain harvest was reported in Soviet statistics.

The two final years, 1989 and 1990, were the most favorable in terms of weather. These two years were the warmest in the twentieth century. In February 1989 the average temperature was 0.5 degrees, and in 1990 as much as 0.3 degrees, above the norm. On 27 February 1990, the temperature reached a record 7.7 degrees higher in central regions. At the same time there was record precipitation, sometimes bringing problems in winter for southern regions because of the interruption of transportation. Exceptionally warm and wet weather in spring produced good harvests in the key agricultural regions: the Ukraine, North Caucasus, and Volga basin. However, the total grain production was lower than, or about the same as, in the late 1970s. Production in 1989 was at the level of 1977, although the latter year had experienced poorer weather. The harvest of 1990 did not reach the level of 1976 and 1978, when 224 and 237 million tons had been produced.

9.3. Food problems

“Is it possible, comrade, for a horse to gallop from Leningrad to Moscow?” went one popular joke in the USSR. “In theory it is possible, but not in practice, because the horse would be eaten in Kalinin.”

During this period the Soviet Union found itself faced with a chronic food crisis which required some emergency measures, such as food rationing, to be undertaken by the Soviet government. Throughout the whole period, Soviet newspapers were full of finger-pointing exposés of

Table 9.9.1. Per capita consumption of selected important foodstuffs in the Russian Federation (kilograms per annum)

Foodstuffs	1975	1980	1985	1986	1987	1988
Bread	131	126	119	119	118	117
Potatoes	131	118	109	113	115	107
Vegetables	84	94	98	97	95	97
Meat	60	62	67	68	71	73
Milk	332	328	344	356	363	386
Eggs (units)	252	279	299	310	315	319
Sugar	43.6	46.7	45.1	47.3	50.9	51
Fish	21.1	22.5	22.5	23.0	22.5	22.0
Fruit	37	37	48	59	59	60

Source: *Narodnoe khozyastvo v RSFSR v 1988*, 1989.

basic foodstuff shortages. Soviet citizens claimed that the food stores were emptier than they had been in years. Although nobody was starving, the diet had become more patchy and monotonous after some improvement in quantity and quality in the 1970s (*Baltimore Sun*, 1978). The question everyone was asking was why the Soviet Union was unable to provide the variety of food that had been available, even if not affordable, in the old days.

One finds a striking difference between the chronic food shortages reported in the press from all regions of the country, and the Soviet statistics that show a relatively high consumption of basic foodstuffs (Table 9.9.1.). In 1980, when the Soviet Union was de facto introducing the rationing of certain foodstuffs, it was officially announced that the average Soviet person's food intake was 3,200 kcal per day, while in the USA it was 2,800 kcal per day. Soviet statistics revealed that the average consumption of meat had reached 57 kilograms. In the Baltic republics a record 76 kilograms was reported to have been achieved, the same as in England. The average per capita consumption of milk and dairy products in the USSR in 1978 was said to have reached 321 kilograms, and in the Baltic republics as much as 458 kilograms. The latter figure was higher than in England and Denmark (Radio Riga, 1980).

According to official statistics, the Soviet consumer was fairly well nourished. However, as Nikita Khrushchev once observed, "You cannot make pancakes out of statistics" ("Food shortage in the USSR..."; 1980). The same could be said by Soviet citizens in the late 1980s. "Where are

the 64 kilograms of meat I'm theoretically supposed to get every year?" a retired worker in Kirov complained to *Pravda*, adding that he was able to buy only about 1 kilogram of sausages a month, and that "sometimes I'm lucky enough to find some bones for soup" (*New York Times*, 1988).

One of the widely accepted explanations is that some inflation of Soviet statistics on livestock production and consumption was caused by a wider definition of "meat" than in Western statistics. The Soviet definition of "meat" included lard, pork fat, heads, and edible organs, which are excluded from the Western definition. According to the USDA estimate, the Soviet definition gave 11 to 15 percent of additional "meat" (*Foreign Agricultural Circular*, 1978). Modern Russian statistical reports recognized that there was an exaggeration in Soviet data on meat consumption (due to including edible organs, fat, etc.), giving a correction of 8 to 10 percent for the Soviet data on meat consumption (*Pokazateli sotsialnogo razvitiya*, 1993). However, this difference is not sufficient to explain the striking gap between Soviet data on meat consumption and the actual amount of meat to be found on the shelves of Soviet stores. The gap was evidently larger than 10 to 15 percent.

In 1988, at the peak of the *glasnost* ("openness") policy on the part of the leadership, *Pravda* published an unprecedented and candid article admitting that consumption figures had been falsified. For years it had been reported that Soviet citizens consumed an average of 64 kilograms of meat a year, but *Pravda* claimed that government investigations had found it was not true. "The figure was born in the 'years of stagnation' (the name for the Brezhnev era) and earlier, when we threw dust into the people's eyes and tried to show them how well off they were." It noted that official figures consistently included large amounts of fat and meat products. In fact, actual figures showed that meat consumption among the poorest 43 million people (around a seventh of the population) had fallen 30 to 35 percent since 1970. There was often not enough meat in state shops to satisfy even the amount allowed in rations (Reuter, 1988). In 1970, average meat consumption was about 48 kilograms a year. It can be suggested that in 1988 a considerable part of the Soviet population consumed about 32 to 34 kilograms of meat a year, 47 percent less than official figures.

This figure can be also confirmed by the paper *Trud*, which, on 8 January 1987, described the food situation in Klaipeda (Lithuania). This revealed that the city consumed about 10 tons of meat a day. According to the paper, this amount allowed each family only 1.5 to

2 kilograms of pork and beef per week. This meant that only about 32 kilograms per capita were available for the average citizen of Klaipeda in 1981–1982, while official statistics indicate that the Lithuanian republic consumed more than 70 kilograms per capita a year (*Trud*, 1987).

Statistics on food consumption on a per capita basis are directly calculated from the output figures and size of population. Thus, agricultural statistics on food consumption include losses of foodstuffs and raw products due to improper handling. The Soviet Union was well known for the great losses of agricultural products incurred through storage, transportation, and organizational deficiencies. The more food the Soviet Union produced, the more it lost. Transportation bottlenecks were frequently cited as the cause of shortages of vegetables and fruits. A typical example was reported by a Western paper in 1979. In Astrakhan, on the Caspian Sea, a good melon harvest was being wasted because the Volga river administration failed to supply the ships to transport the fruit upriver to central Russia (*Baltimore Sun*, 1978).

The large concentration of people in industrial centers made proper distribution vital, and here, as Western experts stressed, the Russians lagged badly behind. The Soviet rail network was overloaded, ripe produce waited at stations for transportation, and food wagons could be delayed for days in sidings. There were virtually no refrigerated rail cars or lorries, and inadequate cold storage centers (*London Times*, 1980). Frozen foods were almost non-existent in the USSR compared to Western countries, although they are a very efficient way of distributing food and keeping it fresh. Western experts wrote that “TV dinners” and various other kinds of frozen foods would only reach the Soviet Union in the future, but that they would make available to Soviet citizens all year round foods that were at present hard to come by (*Journal of Commerce*, 1979).

One should also bear in mind that figures for food consumption say nothing about actual availability in the stores, since the latter also depended on the purchasing power of the population. For example, at present Russian shops are full of a wide variety of meat and dairy produce, although statistically the country consumes 40 to 45 percent less than at the end of the 1980s (*Sel'skoe khozyastvo v Rossii*, 2000). The reason is the weak purchasing power of the modern Russian population now that there is free pricing of food.

Soviet experts, and many of their Western counterparts, pointed to price stability as one of the major factors bringing about a deterioration

Table 9.9.2. Proportion of Soviet family budget spent on food consumption per month, 1960–1975

Foodstuffs	Price for 1 kg	Cost of food basket, ruble			
		1970	1975	1980	1985
Bread	0.15	1.87	1.78	1.58	1.49
Potatoes	0.10	1.08	1.00	0.98	0.91
Meat	2.08	8.32	10.1	10.7	11.6
Milk	0.30	7.70	7.90	8.2	8.6
Eggs (units)	0.10	1.33	1.80	2.33	2.49
Sugar	0.9	2.93	3.00	3.5	3.38
Oil	3.6	2.13	2.43	2.73	2.94
Total cost per person		25.36	28.00	30.0	31.4
Total cost per family		89.8	99.15	98.1	102
Average wage		122	146	169	190
Family budget		219.6	262.8	304.2	342.0
Cost of food basket as percentage of family budget		41%	38%	32%	29.8%
If alcohol is included		50%	45%	38.7%	35.5%

Source: Kiselev and Shagin, 1996.

in the food situation of the USSR at the end of the 1980s. The real income of the Soviet people increased sharply during the 1970s and 1980s, while the prices of all foodstuffs did not change during the 20 years. Wages rose by 3 percent a year between 1975 and 1985, and savings in the banks almost doubled between 1975 and 1983. Western experts argued that, as a result, even a more efficient agricultural system would have had difficulties in satisfying the growing demand for the cheap, subsidized products (*Financial Times*, 1985).

In the middle of 1985 the proportion of the family budget that could be allocated for food consumption was approaching that of the West. The figures for the Soviet Union in 1985 are comparable with those of the United States in 1965. In 1965, the average American spent 28.5 percent of his income on food purchases, and, if alcohol consumption is included, this figure increases to 33 percent (Kiselev and Shagin, 1996).

The corresponding figures for the Soviet Union in 1985 are estimated at 29.8 percent and 35.5 percent (Table 9.9.2.).⁹ Average Soviet citizens were able to purchase far more meat and other valuable foodstuffs than they were able to find on the shelves of the state stores.

Filling the empty shelves of Soviet food stores could have been done either by producing far more food, which was unrealistic, or by raising the prices of basic foodstuffs. Western experts believed that, economically, it would make good sense to double the retail price for meat from the currently artificial low level, which required a subsidy of some 25 billion rubles a year (or 38 billion dollars at the official rate of exchange). On the other hand, experts understood that, politically, this would be disastrous—as Khrushchev found out in 1962 when he ordered a much smaller price increase (“Food shortage in the USSR...”, 1980).¹⁰

The experiences of Eastern European socialist countries also discouraged the Soviet authorities from revising retail prices for food. Governments everywhere were afraid of the political effects of food shortages. The Czechoslovak authorities were appealing, in vain, against the hoarding of food; in Romania, hoarding had been made an offence punishable by imprisonment. Those countries that had less severe shortages, such as Hungary and Bulgaria, had issued regulations forbidding visitors to take food out of the country. East Germany had done the same thing some time before in order to stop Poles buying up the country’s food. The logical way to encourage greater farm output was to push up food prices. Two countries dared to let food prices rise with good effect: Hungary increased food prices by about a third in 1976 and again by 20 percent in 1979, with another 10 percent increase in 1981; Bulgaria put up its food prices by over a third in 1979 when many countries of the Soviet bloc had a bad crop year (“Grain cutback to unsettle...”, 1980). Western experts stressed that this had resulted in a good balance of supply and demand in both countries. But attempts to do just this came unstuck in Poland in 1970 and 1976, when there were food riots, and even more seriously in 1980, when an attempt to increase meat prices led to strikes and the formation of the Polish political movement “Solidarity”.

There were, however, some indications that rises in the price of foodstuffs were permanently discussed within the Communist leadership. Some gauging of public opinion was undertaken by the central party press, which was typical in the USSR when the authorities wanted to

make new moves. It was explained to the Soviet population how heavily livestock production was being subsidized. Average wages had increased from 280 to 350 rubles per month and meat consumption had increased by 14 kilograms. The cost of meat (beef) production was said to be twice the state retail price (*Pravda*, 1978a). *Pravda* invited its readers to discuss this issue, and the discussion on its pages then lasted eight months. “Imagine”, said the paper, “that a peasant selling to the state 1 kilogram of meat for 3 rubles and 17 kopecks (dead weight) is already able to buy 1.7 kilograms of meat in a shop for this money” (1978c).

In 1981, however, the Soviet Union came to a firm decision to keep food prices unchanged. In 1981, at the XXVIth congress of the CPSU, the main resolution stated that the party would continue its policy of supporting stable prices on main foods and industrial products, calling it one of the achievements of socialism. This sensitive issue was still a subject for discussion in the Soviet press, but not until 1988 were a few concrete steps taken to revise food prices.

The confusing character of the Soviet system for the geographical distribution of food, as well as the inflated consumption statistics, make it difficult to find an explanation as to why an acute food crisis developed in a given region at a given time. The local people and administration seemed also to be at a loss, proposing their own popular and superficial explanations for the food difficulties. Local populations usually blamed outside visitors, food exports to other regions, and food aid to Poland; the local authorities reproved the local people for panic buying and for hoarding food, and store staff for holding back supplies from sale.

Surprisingly, the first reports of food problems came out in as early as the summer of 1978, despite an excellent harvest that year. A former Russian resident described the food situation in Leningrad in the summer of 1978 as “more depressing than ever”, saying that “local people were furious and resentful about the shortages affecting practically all foodstuffs”. During the whole of August there was no meat to be had at all, apart from some fat pork. Even in the free markets choice was limited and prices astronomical. There was already a kind of rationing system in the city, that is, a system by which certain large organizations authorized their canteens to put on sale certain foods in short supply. At that time this applied to everything except sugar, butter, bread, and milk. In one large city, Kuibyshev (now Samara, Middle Volga), the author found that people had to spend the whole day standing in line in the

hope of picking up a chicken. And in Odessa (southern Ukraine), if anybody wanted to get meat they had to get up no later than 4 a.m., race down to the market and queue for seven hours or so (“Food situation in Leningrad...”, 1978).

In late summer, Westerners living in the USSR were said to be receiving more and more reports of the absence of meat and cheese from different parts of the country (*Times*, 1978). Although no accurate independent verification was possible, reports from travelers suggested that in the autumn red meat was readily available in only three cities—Moscow, Kiev and Leningrad. “Everyone knows that there are meat shortages”, one diplomat commented (Reuter, 1978). At the end of the year it was reported that Muscovites would be celebrating the traditional New Year’s Feast without its key element—beef. The Russians were grumbling. Despite governmental proclamations, affordable beef was hard to find in Moscow food shops. The shortage was compounded by a rush for what was available. It was unusual for beef to be in short supply in Moscow. Rumors about the causes of the shortage spread, while the Muscovites themselves laid the blame on visitors from out of town who commuted to the relatively privileged stores of the capital (“Soviet New Year feasts...”, 1978).

Why did the Soviet Union face these problems in a year of record grain production? The shortcomings of the distribution system, not the farmers, were apparently to blame, according to the Soviet press. In the course of a press conference, the USSR minister for agriculture admitted there was a shortage of meat in state retail stores, including those in Moscow, and attributed this primarily to the hoarding by citizens of meat prior to the holiday season (Radio Moscow, 1978). A more specific explanation was that the Soviet Union had refrained from its customary meat purchases on the world market so far that year in an apparent attempt to save foreign currency for higher-priority purchases (Reuter, 1978). It was also suggested that the Soviets had had a record 235 million ton grain harvest, so cattle that would have been culled in a tight grain year may have been kept on feed instead (“Soviet New Year feasts...”, 1978).

The major food crisis of the USSR started in 1979 in the wake of the poor weather that year, reached its peak in the following two to three years, and was still noticeable through the second half of the 1980s. The food problems had already emerged at the beginning of winter 1979 in the wake of the severe cold and snowdrifts that followed a bad autumn.

This brought difficulties in wintering livestock in some parts of the country.

As a result, there were unprecedented meat and dairy shortages in the Baltic republics, which had been leaders in livestock production in the USSR. Estonia and Latvia once produced sufficient to feed their own populations and to help supply Leningrad, as well as visitors from Russia who arrived in great numbers and bought up everything in sight. In January and February 1979, this seemed to be no longer the case. Meat had become virtually non-existent in Estonian shops. The food shortage resulted in the panic buying of food in Estonia. The deputy minister of trade for Estonia talked about sharp increases in the sales of such items as flour, sugar, and butter, and even soap, matches, and salt, which customers were storing for future use. For example, sales of flour rose by 50 percent in two major cities of the republic, Tallinn and Tartu (Radio Tallinn, 1979b). Some Estonians apparently believed that the meat shortage had been caused by exports to other parts of the Soviet Union. However, the primary cause was traced to a shortfall in the supply of cattle fodder resulting from bad weather conditions in autumn 1978 and a severe winter. Official statistics revealed that in January 1979, some 17 percent less meat and 13 percent less milk were produced than in January 1978.

In Latvia, food shortages also occurred in February. In a frank interview, a deputy chairman of the Latvian Council of Ministers confirmed that in some areas of the republic meat, butter, and other dairy products were in short supply. He blamed the difficulties largely on the weather the previous year, especially at harvest time, which caused substantial losses of fodder, grain, and potatoes (*Sovetskaya Latvia*, 1979). February was the most difficult month in the Baltic republics. Improvements were expected in March when the output of meat and milk would increase.

In the winter of 1979, some Western papers also reported a meat shortage in different parts of Siberia. The *Daily Telegraph* wrote that even sausages were a luxury and their arrival in Novosibirsk drew such crowds that police were required to control them (1979a). There were shortages of meat, as well as of fruit, milk, and fresh vegetables among those building the Baikal Amurskaya Trans-Siberian railway. The project, billed as the largest being carried out in the world at that time, was supposed to have top priority for food supplies. However, Russian specialists were leaving because they could not get enough of the right foods for themselves and their families.

The crisis worsened in the late summer as the new grain harvest was 25 percent lower than in 1978. One indication of the deteriorating situation is the appearance of news items about the rationing of meat and other products in the summer of 1979. The Soviet authorities officially denied the “anti-Soviet” claims printed in the West about the introduction of rationing in the Soviet Union (*International Herald Tribune*, 1980).

Samizdat sources reported that in some towns coupons for meat and butter were introduced in the wake of the 1979 crop failure. Only two kilograms of meat were permitted per person. In Kazan, the capital of Tatarstan (Volga region), there was a limit of 400 grams of butter per person. It was reported that meat was non-existent in state shops there. Unconfirmed reports said that in summer there was a hunger demonstration in Kazan (*Posev*, 1979). The same source reported that in September rumors spread through Moscow about price increases for food products, causing panic queuing at local shops. On 5 September, the Soviet minister of trade, A. Stroeve, said that these rumors had been the result of a misunderstanding (*ibid.*).

The food crisis in the Baltic republics continued in the second half of 1979. In Estonian cities supplies generally arrived in the shops at 4 p.m. only “to give the working wives a chance” to buy animal produce. Bread was still to be had in sufficient quantities, although the quality was poor. Everything else—milk, butter, cheese, eggs, and chickens—turned up only sporadically. Potatoes had been in short supply since autumn the previous year. In Latvia, things were even worse (“Local leaders detail...”, 1980). For several months the local authorities had been attempting to explain away the meat shortage and reassure the public that shipments to Moscow had not been increased in 1979. The people thought that meat was probably being tinned for military use.

Then at last came official acknowledgement of the existence of serious food problems in the USSR. At party plenums held in the republic in December 1979, many Soviet republic leaders confirmed the existence of food shortage in virtually all regions. The party leader of Belarus admitted “interruptions” in the supply of milk and expressed alarm at the continuing decline in the number of privately owned cows. He complained of shortages caused by wild rumors and panic buying. “Recently, under the influence of various kinds of silly rumors about price rises, the enactment of monetary reforms, etc.,” there had been runs on various goods, and hoarding. He indicated, for example, that

Table 9.9.3. Food consumption in the Soviet Republics, 1980 (kilograms per capita)

Republic	Meat	Milk	Republic	Meat	Milk
USSR	59.2	327.5	RSFSR	63.3	342.4
Estonia	84.7	444.4	Georgia	44.6	323.9
Latvia	78.9	438.7	Armenia	47.7	445.1
Lithuania	73.3	480.2	Azerbaijan	32.9	303.1
Belarus	64.2	392.5	Turkmenistan	42.1	153.6
Ukraine	62.8	351.8	Kyrgyz rep.	36.8	168.3

Source: *Narodnoe khozyastvo SSSR v 1922–82*, 1982.

purchases of flour in the capital, Minsk, had risen suddenly by 1,000 percent the previous summer.

There were huge geographical variations, too, with meat consumption in the Baltic republic of Estonia around double that in Tajikistan (Table 9.9.3.). If the most advanced Baltic and Belarus republics reported food difficulties in 1979, it is reasonable to expect that non-self-sufficient republics must have experienced an even worse situation in terms of food supply. Indeed, meat and milk shortages were mentioned at the republics' plenums by the first secretaries of Azerbaijan, Kirgiz, Turkmen, and Georgia. The Azerbaijan leader, Geidar Aliev, warned that "certain difficulties" in meat supplies would continue the following year and complained that even in Baku one could buy fresh milk only in the morning and "even then not everywhere" (*Bakinsky Rabochiy*, 1980). This unusual frankness on the part of the top republics' bureaucrats (indeed, there had previously been very little information from the republics on this sensitive topic) is easily explained by party bureaucratic rules. They were all only echoing or elaborating the earlier criticism made by Brezhnev of "interruptions" in supplies of other types of consumer goods.

The next year, 1980, the food crisis was perhaps at its peak in the Soviet Union. There was an explosion of reports in the Soviet and Western press about food shortages. This year was of great importance, as the USSR was hosting the XXIIInd Olympic Games, which were boycotted by many Western countries. The Soviet government had invested both its prestige and millions of rubles in preparing for the games. On the eve of the 1980 Olympics, the Soviet Union was experiencing severe shortages of meat and dairy products in what was believed to have become the worst food supply situation for 20 years. Reports from cities

all over the country indicated that in many areas meat had disappeared from the state stores, butter was being rationed, and milk was frequently unobtainable (*Financial Times*, 1980).

The Soviet government could not admit to food shortages, at least in the five Olympic cities Moscow, Leningrad, Minsk, Kiev, and Tallinn. The problem was hard to resolve. In the winter of 1980, even food stores in Moscow were experiencing a severe shortage of grain and animal products. One official report blamed corrupt shopkeepers. *Moskovskaya Pravda* (1980) claimed that undercover inspectors had found 34 shops over a two-day period that claimed they had no flour or macaroni products. However, “when the storerooms were inspected they were filled with 45 deficit items with a total value of 150,000 rubles”. The report claimed that “all this was kept in storage areas during rush hours when Muscovites were hurrying home from work”. The widespread shortages of sausage, grain products, and cheese in Moscow were attributed by the local paper to panic buying, hoarding, and impropriety on the part of shop staff. In spring, the food situation changed little in Moscow. The shortage of food in the capital’s shops in general was the subject of a tough official decree issued by the Moscow Party Executive Committee, which contained a stern warning to food shops not to hold back supplies from sale (*Times*, 1980).

In July, just before the start of the Olympics (on 19 July), the shortages were still being felt even in Moscow, where cabbages had disappeared from the markets, carrots were unusually scarce, and, for the first time in living memory, shops were running out of milk. Western observers believed that the Soviet leadership was deeply concerned about the situation (*Financial Times*, 1980). However, a little later trucks began rolling into Moscow with the extra supplies of food and clothing—luxuries that Muscovites had always hoped the Olympics would bring them. Many of them felt that the idea was to hoodwink the foreign athletes and tourists coming to the games into believing that Moscow was always as well stocked with oranges, bananas, cheese, and meat as it would be for the three weeks of the games (Whitney, 1980b). Before this the city had in fact been closed to outside visitors.

In the other regions, Soviet people blamed the shortage of meat and many consumer goods over the first half of the year on the government, which was thought to have been holding back supplies so that it could release them during the games in order to impress foreign visitors to the Soviet Union. The situation was desperate. In the northern city of

Table 9.9.4. Official data on meat and milk consumption per capita in selected Russian provinces where food shortages were reported in 1980 (kilograms per capita)

Region	Province	Meat consumption	Milk consumption
Northern	Arkhangelsk	54	328
Central	Jaroslavl	52	340
Volga-Vyatka	Nizhnii Novgorod	55	312
Volga	Tatarstan	57	299
	(Kazan, Naberezhniye Chelny)		
	Samara (Kyibyshev, Togliate)	62	295
Urals	Bashkiria (Ufa)	64	305
	Chelyabinsk	68	309
Western Siberia	Novosibirsk	59	339
	Tyumen	65	338
Eastern Siberia	Irkutsk	57	318
Far East	Yakutia	81	408

Source: *Pokazateli sotsialnogo razvitiia*, 1993.

Arkhangelsk, milk was sometimes sold only to those with a doctor's prescription or to nursing mothers, while in Kazan (Tatarstan), a provincial capital, butter was rationed through a card system on the basis of one kilogram per month. In Novosibirsk, a Western Siberian city with a population of 1.3 million, people said that meat was never stocked in state shops and that they were limited to the purchase of about two kilograms of meat a month at their workplaces (Schnemann, 1980). In Tyumen, another Western Siberian city into which the Soviets had channeled millions of dollars in order to develop critical oil and energy reserves, milk, butter, cheese, and meat were in chronically short supply. The situation was also said to be very serious in Eastern Siberia. Reuter reported that one traveler to the city of Irkutsk in Siberia, which had a population of more than half a million, reported seeing a sign announcing that meat was on sale to diabetics (Reuter, 1980b). Dissidents returning from visiting political exiles reported that there had been almost no meat or butter in several cities in Yakutia for over a year (*Financial Times*, 1980). Again, all these reports are in striking contrast to official statistics for the provinces in question (Table 9.9.4.).

Several remarkable events were said to have occurred in the Volga region in 1980. Four strikes were reported by many Western papers: in the giant automotive manufacturing complexes at Gorky (today Nizhne-Novgorod) and Togliatti in the Volga basin, in a tractor factory in the Ural Mountains city of Chelyabinsk, and in the giant Kama River truck plant in Naberezhniye Chelny. These were extraordinary, even unbelievable stories. Labor protests were extremely rare in the Soviet Union. The Soviet press denied the reports in Western newspapers about the strikes with unusual vehemence. But the reports had come from reliable dissident sources, according to Western businessmen and diplomats in Moscow. Even officially sanctioned Soviet press reports acknowledged that dairy production in the Volga basin was running 45 percent below planned levels that year. Western diplomats noted that two of these cities—Naberezhny Chelny and Chelyabinsk—were visited soon after the strikes by high-ranking Politburo members. The Western author suggested that the Soviet authorities had responded to workers' protests by moving quickly and quietly to improve the food supply (*Newsweek*, 1980).

The year 1981 began with President Brezhnev making an unusual New Year's Eve appearance on Soviet television, promising that the government was paying special attention to "the food problem". It was his first personal appearance on an end of year television program since 1973. In more recent years, announcers had read messages in his name or in the name of the Communist Party Central Committee. By delivering the message himself, Brezhnev underlined the high priority of food shortage problems (*Daily Telegraph*, 1981).

However, in winter the food situation in Moscow and other, usually better supplied, major cities, especially those designated as "hero cities" (on the basis of their resistance to invading German forces during the Second World War), got progressively worse. In Moscow, the produce department of a grocery store ten blocks north of the Kremlin contained only five items on Sunday: spongy, small green apples covered with brown spots; cabbages; potatoes; carrots; and onions. At the meat counter there was no beef or chicken, only crudely hacked pieces of pork.

In ordinary provincial centers, the situation was worse than it had been for three or four years. In Cherepovetsk (Vologda oblast), an industrial city of 274,000 people, milk was sold on prescription for infants: doctors could prescribe one liter a day for babies up to one year old, and half a liter a day for children up to the age of two. In the small town of Kirilov (Vologda province) there was no butter in local stores. Local

people complained that the tasty Vologda butter, for which the region had once been famous, could no longer be found. The shortages of butter and cheese became more acute, and the milk problem grew serious only that year. It was a problem of both quantity and quality, and even the Vologda newspaper *Krasny Sever* complained that state farms were selling too much “second-rate” milk. At local party meetings, citizens were told that their “temporary difficulties” were occurring because Vologda province had to send its products to other parts of the country (*Newsweek*, 1981).

Westerners visiting Novosibirsk in Western Siberia said that shops there had simply closed their meat departments for the duration. They had received no supplies for months and had no prospect of getting any (Apple, 1981). Sverdlovsk, the largest city in the area with its population of 1.2 million, virtually ran out of food for several days in February, according to one reliable Soviet source. “There was almost nothing on the shelves, not even bread”, the source reported. “It was so bad that Sverdlovsk television had to tell people to be patient, that food would arrive in a few days, and it did.” According to another Soviet source, Sverdlovsk was one of the four counties in which leaflets were circulated that February, before the Communist Party Congress, calling for public protests against food shortages. Party members were said to have been told in closed party meetings that scattered demonstrations had occurred in some cities—the other three reportedly being Tobolsk, Odessa and Krasnodar—but had quickly dispersed (*Los Angeles Times*, 1981a).

Meat was in short supply everywhere in the USSR during 1981. One of the peculiarities of this year was that shops everywhere ran short of margarine and cooking oil because of the repeated failure of the sunflower crop (*Sovetskaya Rossia*, 1981). Fish, an important source of protein at Soviet dinner tables (a popular Soviet slogan claimed “Fish is meat, too”), was also in short supply as fish catches had seen a long-term decline. One visitor to Estonia found that fish supplies in the capital city, Tallinn, had dramatically worsened. Even the central fish restaurant was empty. “The presumption among foreign analysts is that the reported lack of fish in the Tallinn fish restaurant, unusual there, might have occurred because supplies were shipped out to cope with food shortages elsewhere in the country” (*Christian Science Monitor*, 1981).

In the autumn of 1981 the Soviet government had to introduce (without much publicity) a system of food rationing around the country (Reuter, 1981). According to some sources, a Soviet Central Committee

letter to local party organizations called for the strict implementation of a rationing system that had long been disregarded in practice. In Moscow, these regulations had to be strictly observed and violators faced severe penalties. Some Russians said the new rationing of basic commodities was directed against the tens of thousands of people from the provinces who flocked to the main cities each weekend to buy large quantities of food (*Washington Post*, 1981).

In fact, the rationing system had been introduced in several regions of the USSR earlier, at the beginning of 1980, but there was no prior announcement in the central and local press, and the Soviet Union strongly denied Western press reports of the existence of food rationing anywhere in the country. However, faced with a third successive crop failure, the USSR could not help but introduce rationing even in the major cities that were accessible to Western visitors.

By the end of 1981 there had been persistent reports of the de facto rationing of meat and dairy products from various regions of the country, including Moscow oblast, Irkutsk, the city of Moscow itself, and Vologda. In Moscow, for example, the purchase limit on butter was a quarter of a kilogram, but butter was extremely difficult to find there. In December, the acute butter shortage in Moscow lasted for almost three weeks. Meat was available in Moscow, but limited to two kilograms per person. Milk was not rationed, but there was simply no point looking for fruit and vegetables (*Le Monde*, 1981).

In Kazan, coupons were required in order to buy meat and butter, and the ration per person was extremely small: 700 grams of red meat a month, an equal amount of pressed meat products, and 400 grams of butter. It was possible to buy only 10 eggs, two kilograms of flour, one liter of vegetable oil, and one kilogram of sugar and macaroni. However, the shelves were almost empty in many of the nation's stores. It was reported that in Kazan the food shortages had been steadily worsening over the previous few years, and rationing had begun in all the big Tatar cities about 18 months earlier (i.e., at the beginning of 1980) (*Pravda*, 1981).

In Irkutsk, on 1 May, the authorities introduced meat and butter rations of one kilogram and 300 grams per person per month respectively. At first, the rationing in Irkutsk was called "experimental". Each family was assigned to a neighborhood store that kept a careful record of what the family had purchased. It was reported that some people reacted with outrage, plastering the wall of the regional party organiza-

tion with hundreds of red ration coupons (*New York Times*, 1982a). Irkutsk province was a good cattle-farming area, but local people strongly believed the meat went to cities like Moscow and Leningrad. For a considerable period there had been problems with meat and dairy products such as milk, butter, and cheese. It was difficult to buy cheese anywhere in the country, but in Irkutsk people had not seen it for four years (“USSR national affairs...”, 1981).

In Georgia, party leader Edward Shevarnadze openly confirmed in the Soviet local press that the rationing of some produce was being introduced for the urban population. He said that certain difficulties would arise for the inhabitants of rural areas, who would no longer be able to buy up large quantities of butter and meat in city stores. The republic’s government had imposed a monthly ration for butter (600 grams) and sugar (two kilograms) per person, its first food-rationing measures since the late 1940s. Although some difficulties with fresh meat existed, it was not rationed (*Daily Telegraph*, 1982). Mr. Shevarnadze, who had a record of consistent frankness in discussing the problems facing his republic, became the first top Soviet official to go on record as acknowledging the introduction of rationing.

One of the most popular explanations of the severe food difficulties was that in 1981 the USSR had to export large amounts of meat to its allies in Eastern Europe, where things were looking bleak that year. In the summer of 1981, the crisis in Poland exploded when the government tried to raise food prices. Its attempt triggered the trade-union revolution, which in turn led to a military takeover. But the food crisis was not unique to Poland. It was reported that Romania, once the bread basket of the Balkans, had introduced bread rationing in October. Even normally well-fed Czechoslovakia was feeling the pinch. What was politely known as the “regulation of food distribution”, a form of rationing, was introduced in various parts of the country. Only Bulgaria bucked the trend (*Economist*, 1981). However, the Soviet authorities denied rumors about increases in food exports. On 30 December 1981, the trade-union newspaper *Trud* wrote: “incidentally, conversations that are sometimes heard, saying that we are selling much meat abroad, are unfounded. Imports of these products over the course of the last ten years (1970–1979) has increased from 165,000 to 611,000 tons, and exports, on the contrary, have been reduced over this time from 55,000 to 34,000 tons.”

In 1982, the food crisis in the USSR continued (this was the fourth year of the recession in the agricultural sector), but by the end of the

year there were some improvements. In 1982, Mr. Brezhnev first mentioned the “Plan for Food” program, which was implemented in May 1982. In his address to the Central Committee the Soviet leader said: “The food problem, economically and politically, is the central problem of the whole 1981–1985 five-year plan.” Government policy in relation to food supplies seemed to focus on the distribution system, suggesting that food shortages stemmed more from major breakdowns in the distribution systems rather than from an actual food deficit. The Soviet authorities already had a variety of rationing systems at their disposal, and often made use of them. Apart from issuing ration cards, the classic method repeatedly used in a small number of provincial, and usually remote, cities was for the government to distribute limited amounts of meat and vegetables through factories and other workplaces. The authorities could, and did, instruct food stores to limit the amount of purchases or to serve only local residents, or a limited list of nearby residents.

One government response to the shortages had been to offer special access to food supplies to various privileged or productive groups. Members of prestigious bodies like the Academy of Sciences, the Union of Writers, or athletic organizations had special order forms for meat, dairy products, and vegetables. However, one effect of this, as Western observers said, had been to further drain supplies from ordinary stores. For consumers at the bottom of the pecking order, such as aging pensioners, the result could be long hours standing in queues, or having to pay the higher prices of the free market.

In December 1982, the first reports emerged of a wider assortment of food in some large cities. The Western media wrote of “the mysterious increase of food for the Muscovite in the street”, although it is unlikely that this improvement was due to Brezhnev’s food program. The change was noted almost immediately after Yuri V. Andropov came to power after the death of Leonid Brezhnev in November. In their constant struggle with shortages, the Russians had become keenly sensitive to any change in the length of queues, to the wider distribution of rare commodities, or to any improvement in the variety of goods. People began talking of an improvement in supplies of milk and sour cream, decent meat and citrus fruits. Goods like imported Finnish sausage appeared, not just in the special shops for the elite and foreigners. Different explanations were proposed for this phenomenon. It was suggested that Andropov’s threat of strong measures against the corrupt had frightened store managers into releasing more goods to the general

public and hoarding less for special customers. Linked to this version was the reported arrest of the director of “Gastronom number 1”, Moscow’s best delicatessen, which was still known by its pre-revolutionary name, Yeliseyev’s. Later, the director was executed by shooting. Another theory was that Andropov had ordered the shops to be replenished from government reserves in order to enhance his debut and preclude public outcry (*New York Times*, 1982b).

These improvements proved short lived. According to *Moskovskaya Pravda* on 31 March 1983, the top Moscow official Grishin admitted that “indispensable articles are lacking in many shops” and that the supply “of fruits and vegetables is insufficient and of very low quality” (“USSR reports food shortages...”, 1983). Outside Moscow the shortages continued: one reporter visiting Tbilisi in Soviet Georgia a week earlier found sugar and butter still being rationed and widespread meat shortages. Several Georgians reported seeing meat in the shops no more than four times a year (*Wall Street Journal*, 1983). Some deterioration in food supplies was observed the following year (1984) because of the poor harvest caused by a drought in the main agricultural zone of the country. From the southern republics came news that the fruit and vegetable harvest was disappointing, indicating that Soviet shoppers would have a hard time finding such products in winter. The government apparently managed to cope with the consequences of the poor harvest—at any rate, no reports of anything unusual in terms of food supplies in the regions were published in Western and Soviet papers.

Under Gorbachev (1985–1990), despite more and better harvests, shortages of the most necessary food items had become chronic and even more disappointing for Soviet people who were urging changes for the better. Even with food imports, official consumption figures for milk and meat products, fruits, and vegetables fell well short of what the government defined as a “rational norm” for Soviet citizens. The only items now available in sufficient quantities, according to government figures, were fish, eggs, sugar, potatoes, and bread—hardly the stuff of a balanced diet (*Christian Science Monitor*, 1984).

Soviet consumption statistics are still of little help in understanding the real situation. In reality, “interruptions in supply” could happen with respect to any product in any region. For example, in January 1986, for the first time in 30 years, eggs were “in deficit” in Moscow. For three days there were simply none in the shops, while housewives grumbled in queues that there would be no cakes for the New Year parties (*Guardian*, 1986).

The food situation was unstable, and any emerging issue could cause a food crisis in the country. One such issue was the Chernobyl accident. The Soviet Union did not issue any reliable information on the extent of the damage to agricultural production in the Ukraine, Belarus, and western parts of the Russian Federation caused by the Chernobyl nuclear reactor explosion on 26 April 1986. The Soviet Union reportedly inquired about purchasing food from Western Europe and the United States, indicating that damage to Soviet farm regions after the Chernobyl nuclear disaster was far worse than initially believed by Western experts, although some authors disagree as to the scale of the disruption to Soviet agriculture and the economy (e.g. Zeimetz, 1990).

As early as the end of May, the first news broke about emergency negotiations for massive food imports from European countries. It was reported that the Soviet Union hoped to buy record amounts of food from the European Common Market because of losses caused by the Chernobyl nuclear disaster. One British member of the European Parliament said in a radio interview that there could be “real deprivation” in the Soviet Union the following winter unless substantial amounts of food were imported. The expert did not indicate the size of the Soviet request, but said it was “far in excess” of the relatively small amounts of food the Common Market had sold before and would amount to “the sale of the century” if it came off.

The request covered grain, butter, beef, and powdered milk. The expert cited dairy products as Moscow’s most pressing need because of the contamination of cows in the Ukraine. Another source reported the purchase of dairy cows from the United States (*Wall Street Journal*, 1986).

The member of the European Parliament suggested that selling food on the scale the Soviets were seeking would present major transportation problems. Large-scale food sales to the Soviet Union could cost European taxpayers “a lot of money” because the Community’s budget for paying export subsidies to farmers was exhausted. Any agreement with the Soviets, the MEP argued, should be made contingent on Soviet willingness to share information with European countries about its nuclear power-plant capacity, and to allow inspection of its plants.

The Soviet request was unusual because it was made through diplomatic channels. Normally, the Soviets bought food through third-party brokers, and the Common Market maintained the fiction that it did not know where the food was going when it sold to the brokers. Common Market countries also announced a ban on imports of food and live ani-

mals from seven East European countries affected by the nuclear disaster. Canada issued a customs alert for all imports of fresh produce from Europe after a load of radioactive Italian vegetables turned up in Vancouver (*Chicago Tribune*, 1986a).

One further example of the vulnerability of the Soviet Union to food shortages concerned a campaign to combat illegal earnings in summer 1986. After two weeks, the Kremlin's crackdown on bribery and extortion unexpectedly resulted in food shortages at markets across the nation. A lengthy article in *Pravda*, under the headline "Is the cucumber guilty?", claimed that reporters, dispatched to farmers' markets as far away as Siberia, found empty shelves where there should have been fruit and vegetables. Farmers with a legitimate right to sell surplus crops in the popular open-air markets were wrongly being stopped under the new decree. In a number of cities these markets (although far more expensive) supplied up to half of all the agricultural goods consumed by the population, and the 1 July anti-corruption decree was supposed to help, not hinder, the flow of goods. The decree outlawed certain private work and prescribed stiff penalties for bribery, embezzlement, extortion, and the unauthorized use of state equipment—usually cars and trucks—for profit. It also targeted earnings from "individual activities", although the language of the legislation apparently left room for confusion. As *Pravda* reported, overzealous militiamen terrified farmers who were legally selling surplus produce at a market in Perm, located in the Ural mountains. In the Siberian city of Krasnoyarsk, a misreading of the law prompted police to bar a number of farmers from taking their wares to the town's market, as a result of which no fruits and vegetables were on sale. However, a tour by Western journalists of vegetable and fruit markets in Moscow indicated no unusual shortages of produce (*Chicago Tribune*, 1986b).

An unprecedented sugar crisis occurred in the country in 1987 and 1988 as the result of another of Gorbachev's campaigns. A decree against alcoholism came into force on 17 May 1985. At first, this campaign resulted in a wait of many hours in queues to buy vodka. Tough measures restricting the official production and sale of alcohol had led to a sharp rise in the amount of *samogon* (home-distilled alcohol) being produced. This, in turn, had led to the disappearance of sugar from the shops and to a sugar shortage caused by the production of homemade vodka. The sugar shortage, the first in the country since World War II, was an especially sore point among consumers.

One samizdat document reaching the West from a Soviet dissident recorded a protest made at the beginning of the summer of 1987 by the inhabitants of two Ukrainian villages. The villagers were angry about the disappearance of sugar from local shops. "People have gotten used to the fact that for years there have been shortages of milk and meat products", the document stated, "but the disappearance of sugar was the last straw." In protest, the inhabitants of the villages of Glybnoe and Novo-Dmitrovskaoe in Sumy oblast threatened to boycott the elections to the USSR Supreme Soviet that were to be held on 21 June (Teague, 1987).

Any samizdat report was not easy to confirm, but a central Ukrainian paper also reported a sugar shortage caused by the production of home-made vodka (*Pravda Ukrainy*, 1988). Similar reports were published in the local papers of other Soviet republics. According to *Sovetskaya Latvija* (1988), a restriction on the purchase of sugar to 1 kilogram per person per month was introduced in the republic in spring 1988. In Bryanskaya province (Central Russia), rationing coupons for sugar at 1.5 kilograms per person appeared in May 1988. In 1988, the government newspaper *Izvestia* said the government should reassess the anti-alcohol campaign, since the mass disaffection caused by the sugar shortage was more dangerous than drunkenness (Reuter, 1988a).

After three years of the Gorbachev era, much of the Soviet public had not seen any tangible benefits from *perestroika* ("restructuring"). According to the official statistical yearbook for 1988, in most Soviet republics and one-third of the provinces of the RSFSR the rationing of foodstuffs still existed. One prominent economist for the journal *Novyy Mir* argued that the situation in the produce and consumer markets had not improved but had in fact deteriorated during the three years. Frequent shortages of everything from citrus fruits to meat and coffee had long been a fact of Soviet life. There were the same queues in stores and the same empty shelves as before. Shoppers were traveling up to hundreds of kilometers to the better-supplied shops of major cities, and Moscow shops were stormed by customers. The official *Literaturnaya Gazeta* estimated that 65 billion man-hours were spent every year by shoppers "eaten up by nervous tension while standing in lines" (*London Times*, 1988). Political analysts warned that continued shortages, after three years of Mikhail Gorbachev's *perestroika*, could undermine public support.

The most radical measure to combat the rapid disappearance of foodstuffs from the stores was a severe increase in retail prices. Subsidies

on food production had been raised because of the anti-alcohol campaign. In the Brezhnev era, the state had compensated for subsidies by higher sales tax on alcohol, tobacco, and prestige products, and on imports of goods. But now the production of vodka had fallen sharply and the country was buying less abroad. Something had to be done. However, to start a revision of the price system in the late 1980s would be dangerous. Taking into account the existing food shortages it was easy to predict that price changes would first bring the disappearance of all products from state stores as a result of panic hoarding. A large-scale food crisis would be inevitable in the USSR.

In 1986, the Soviet Union had already attempted to implement a sweeping price reform. Apparently, because of political fears that an announcement of food price increases might unsettle the population, meat prices had been raised in the following way: meat had simply disappeared from regular stores and was instead sold in ample quantities in newly established cooperative stores and at collective farmers' markets. The price for the least expensive cuts was five rubles a kilogram (about 3.50 dollars a pound), or double the old price (*Baltimore Sun*, 1986).

However, with higher prices looming on such basic commodities as meat, milk, and bread, the Soviet people felt threatened and less inclined to be enthusiastic about Gorbachev's program. People learned about it from the salespeople when they went to the shops and complained that this had not been officially announced (*Guardian*, 1987). *Pravda* reported that it had received more letters from readers about the planned price increases than on just about any other subject. The paper said that complaints about prices were among the most frequent and "heated" part of the mail it received (*Pravda*, 1988). There were some reports that more expensive meat had also appeared in state stores. For example, in state stores in Riga pork appeared priced at 3.5 rubles rather than 2 rubles. One official explained that the pork had been produced on private holdings, and because of an insufficient network of cooperative stores it had been decided to sell it in the state stores (*Sovetskaya Latvija*, 1987).

Soviet people reacted to the new prices by panic purchases. Telegrams sent from a number of towns in the country reported that a section of the population was buying goods on an unusual scale. On 29 October 1987, *Pravda* reported how "People explain that there will soon allegedly be a steep rise in prices, and someone has supposedly already seen new price lists and tariffs".

The government was evidently concerned at the hostile public response to planned changes to the system of keeping the price of basic foodstuffs and accommodation low. The Soviet authorities had to promise that there would be a stage-by-stage shift in the present pricing mechanisms, with the first stage affecting only wholesale prices, or an overall re-examination of wholesale, retail, and agricultural prices with no change before 1990. It was announced that the Soviet Union would introduce a new system of wholesale prices from 1990, and of retail prices only from 1991 (*Financial Times*, 1987). The price reform was suspended while the food situation continued to deteriorate.

9.4. Summary

There was a serious miscalculation on the part of Soviet planners concerning the growth of livestock numbers and potential grain production during the 1980s. The miscalculation was a result of the simple extrapolation of the rate of growth of Soviet agricultural production in the previous period. The real rate of growth should have been lower due to a worldwide tendency towards diminishing returns on investments in agriculture, and due to some specific problems within socialized agriculture (such as lack of storage places and bottlenecks in transport), which remained unsolved. As it was, the gap between grain demand and grain production during the 1980s became the largest in Soviet history. Even an average harvest could barely meet domestic demand for grain.

It was unfortunate for the Soviet authorities that weather conditions in this period were some of the worst. The direct consequence of three years of poor weather (1979–1981) was an acute feed grain crisis in the livestock sector that could only partly be relieved by massive imports. The grain shortage and recession in the livestock sector led to chaos in food supplies in the USSR. Under Gorbachev, the growing confusion in Soviet agriculture gave little opportunity for farmers to take advantage of the later good weather, and the food crisis continued until the breakup of the Soviet Union.

NOTES

- 1 From the 1970s, this term is used in reports by Soviet planners and statisticians for agricultural production facilities combined with some branches of

industry and trade networks closely connected with the production and distribution of foods. Thus “agro-industrial complexes” included crop-growing and livestock farms, feed-production enterprises, food-processing and some light industries, trade networks for the selling of agricultural products, different specialized services necessary for agricultural work, storage facilities, etc. The term was also used for large territorial units of combined farms and different elements of the agriculture and food infrastructure.

- 2 The most ambitious components of the overall agricultural production target for 1981–1985 were the 16 percent increase in meat production to 17.25 million tons a year from 14.9 million tons in 1976–1980, and the 18 percent increase in grain production to 243 million tons a year, from an average of 204 million tons in 1976–1980. Wadekin stresses that these average figures used by Soviet planners, although useful for evening out annual fluctuations, are very dubious with regard to Soviet meat and grain production during 1981–1985. The official figures for meat production would look far more unrealistic if the calculations for the rate of growth were based on the relatively low livestock numbers at the end of 1970. As far as the grain plan is concerned, it should be assumed that the planners did not take the two consecutive harvest failures of 1979 and 1980 as the starting point for their calculations, but rather used a hypothetical figure for 1980 that was thought to fit into a mid-term trend. Some of the author’s scenarios show that, in order to meet plan targets, the growth for grain production should have been 43 percent as opposed to the 18 percent planned, and for meat production as high as 28 percent as opposed to the 16 percent announced by the Soviet planners. The scenarios also suggest that, in order to meet the average figures for the five-year period, the Soviet Union should have produced in the final year, 1985, far more grain and meat than was planned for that year.

Scenarios for grain and meat production in the USSR, 1980–1985 (millions of tons)

Year	1980	1981	1982	1983	1984	1985	Average
Grain production	189.2	215	227.5	240	252.5	270	240
Meat production	15.1	15.5	16.3	17.2	18.2	19.3	17.3

Source: Wadekin, 1978.

- 3 A resolution of the Central Committee of the Council of Ministers “On Developing All-Union Socialist Competition among Stock-Raising Workers for the Increased Production and Procurements of Livestock Producers in the 1979–1980 Winter Period” was adopted. The resolution ordered the creation of a cash incentive plan designed to increase meat and milk production and protect herds during the winter. Under the plan, republic would compete against republic, autonomous region against autonomous region and collective farm against collective farm, for cash prices awarded for performance. Successful farms would also receive buses and cars. Top prices were to range from 5,000 rubles (7,750 dollars) for state and collective farms, to 100,000 rubles (155,000 dollars) for republics (*Pravda*, 1979). Similar resolutions were issued every year from 1979. It was also reported that peasants received profits from

- an increase in purchase prices in 1 January 1983. In spring 1983, a decision was adopted about increasing the wages of workers on livestock farms.
- 4 The USSR purchased large amounts of wheat, sometimes as much as 50 percent of grain imports as a whole, although the country should have had sufficient food grain. Some Western experts called the food grain imports one of the enigmas of the USSR (“Difficulties of implementation...”, 1982). The reason was probably that the country had to allocate a considerable part of the food grain harvest for feed because of the irrational structure of cereal crops. It is also known that the quality of food grain was low, so the Soviet authorities could see some advantage in delivering its own food grain (mainly spring wheat) as livestock feed and instead importing high-quality food grain from abroad to satisfy the internal demand for good-quality bread (*Washington Star*, 1980).
- 5 In his speech to the USSR Communist Party Central Committee on 3 July 1978, Leonid Brezhnev stated: “We are seeking to ensure that all grain used for the needs of livestock is fed after processing and in a balanced way.” Subsequently, a new government agency in the USSR Ministry of Agriculture—the Main Administration for Mixed Feed—was established in October 1978. Thus the Soviet mixed-feed industry took on a new organizational structure with two branches, one in the Ministry of Agriculture and the other in the Ministry of Procurement. The latter produced about two-thirds of the total mixed-feed output and its products were more complex. Feed mills associated with the Ministry of Agriculture (from 1978) were inter-farm plants, either serving the 10 to 15 farms in a district, or located on large, specialized livestock farms. These plants basically used locally produced grains and other raw materials, which were supplemented by protein-vitamin mixes purchased from the Ministry of Procurement (Severin, 1979). In 1977, Soviet mixed-feed plants—under the aegis of both the Ministry of Procurement and the Ministry of Agriculture—produced about 51.3 million tons of mixed feed. This came to over three times the 15.5 million tons produced in 1965, but was still less than half the country’s total feeding of concentrates. Plants were to boost mixed feed output to 68 million tons in 1979, to 77 million in 1980, and to 100 million in 1985, or 70 percent of the total feed grain (*ibid.*).
- 6 The following anecdotal case was published in the Soviet paper *Trud*. In 1982, in a small town in Tatarstan, in order to receive a driver’s license urban inhabitants had to bring 200 kilograms of hay to local collective farms. Urban citizens collected hay in urban parks and alleys. The local administration explained (to the paper) that this action had been introduced because of the acute fodder shortage in the district. It was said that some industrial plants were asked to provide trucks for the transportation of a hundred tons of straw from neighboring steppe regions to local kolkhozes (*Trud*, 1982).
- 7 Soviet statistics indicate that meat production in March and April (after some growth in winter) was 2.27 million tons, down 6 percent from the 2.4 million tons in the same period in 1979. The *Ekonomicheskaya Gazeta* reported a substantial decrease in meat and dairy production in the summer. Meat production in June was about 11 percent below the June 1979 level (*Washington Post*, 1980). In July, meat production (in the public sector) was already 15 per-

cent below the June 1979 level. However, in September 1980, in the public sector, the meat output was surprisingly higher than in 1979. Wadekin (1980b) points out that the pork output of kolkhozes and sovkhozes in September increased above the August level by 86,000 tons, or 29 percent, whereas during the same month in 1979 it had increased by only 28,000 tons, or 8 percent. In total, it even slightly exceeded that of the previous year's September, although total pig numbers were lower on both 1 September and 1 October 1980. Moreover, the average weight of pigs slaughtered in September was again lower than the year before (101 as against 104 kilograms), so that the number of slaughters per ton of pork output was greater in September 1980 than in September 1979. The additional animals slaughtered could not have come from the kolkhoz and sovkhoz herds. Thus the output increase must be attributed to an above-normal number of pigs sold by private owners under administrative pressure to the kolkhozes and sovkhozes, and registered by these as their own production and deliveries. It is likely that this process of forced meat selling to the state started in August 1980 when the big harvest shortfall began to emerge.

- 8 In 1984, a large-scale propaganda campaign for the reduction of feed grain consumption in the livestock sector was launched in the USSR, with the publication in the Soviet press of numerous didactic articles describing the "success stories" of grain saving. Soviet papers often mentioned the experience of one pig-breeding farm in Belgorod province, which managed to reduce the consumption of feed grain by 33 percent, saving some thousand tons of grain due to a radical increase in silage consumption. It was said that this change in rations allowed a reduction in the cost of production of 1 centner of weight gain, which was one and a half times lower than the average in the RSFSR (*Izvestia*, 1984).
- 9 To estimate the cost of a food basket for a family we have used an average Soviet family, which, in early 1980, was 3.27, and 3.25 in 1985 (*Naselenie Rossii*, 1998). We also take into account that the normal Soviet urban family had 1.8 wage earners (Bush, 1964). Expenditure on alcohol was assumed not to have changed since the 1970s, amounting to 19.5 rubles per family a month.
- 10 The caution shown by the Soviet authorities on the question of price rises is indicative of a revision of price policy on selective commodities in 1978. The Soviet Union announced an increase in the price of petrol and some other goods and services, but cut the cost of some clothing using synthetic threads. Jewelry made of gold and platinum was to cost an average 60 percent more. There was also a 20 percent cut in the price of black-and-white television sets. In the course of these revisions the prices of imported coffee, cocoa beans, and chocolate were also increased. The need for this was explained by saying that there had been a considerable increase in foreign prices (*Moscow News*, 1978).

Conclusion

Russian farming has always been unstable because of its complex climatic conditions. Russia's records of the difficulties caused by weather vagaries are impressive. During the last hundred years the country went through at least 30 years of severe drought. Some years were also problematic due to severe frosty winters or summers that were too rainy and cold. Thus, an average decade in the history of Russian agriculture comprises two or three years of large droughts (sometimes occurring in a row) and one year of crop failure caused by other unusual weather conditions. In the 1970s, for example, there were three large droughts in 1972, 1975, and 1979, while the year 1977 was unfavorable because of very rainy and cold weather. Then, after the drought of 1979, two more years with adverse weather followed in a row (1980 and 1981). Such unstable weather conditions should be recognized as making agriculture difficult.

As with any farming in marginal climate conditions, Russian agriculture should have been developing according to a “survivor” rather than an “advancer” model. The behavior of a “survivor” should differ from that of an “advancer”: for the former, success means being able to reproduce the basic living cycle, while the latter aims to raise the standard of living. This means that the “survivor” would choose one strategy for farming and the “advancer” another.

Some features of pre-revolutionary Russian agriculture were considered by many Russian agricultural experts to be archaic—for example, the domination of cereal crops in both forest and steppe zones. These experts emphasized that more labor-intensive and market-valuable crops, such as potatoes, vegetables, and sugar beet, were needed to make the country a modernized Western-style state. Emphasis was also placed on increasing livestock breeding. The introduction of grass rotation was meant to open up the opportunity for progress in the livestock

sector, which still provided negligible input in terms of the food consumption of Russian peasants. The experts noticed that there was some movement in the right direction but insisted on the rejection of traditional cereal-oriented farming. This was the typical position of the “advancer”.

However, the Russian peasants moved rather in the opposite direction. They continued to sow cereals in any available areas and were not keen to sow other crops. They reduced grasslands in favor of cereals and fed livestock in such a way that the animals were merely given the chance barely to survive until the following spring. The Russian peasants tilled their arable land carelessly and applied little manure and no mineral fertilizers. A striking example of this strategy was the ploughing up of most hayfields and grassland in the Central Black Earth region at a record rate. The disappearance of the grassland led to continued problems for livestock breeding in this region until quite recently. However, it would be incorrect to say that Russian peasants did all these things because they favored subsistence farming—quite the opposite. Russian peasants were trying to sell their produce on the market. The monetary proportion represented by agriculture and handicrafts in a family’s budget reached 40 to 50 percent for peasants in many agricultural regions of the Russian Empire. Moreover, they preferred to sell grain than to feed it to their cattle, and only if the market was restricted or not accessible did they allow themselves and their animals to feed on the home grain reserve. This was simply another strategy of the “survivor”.

Although Russia has a colossal territory, the European part of the country has been overpopulated since the beginning of the twentieth century. The problem was how to feed an overpopulated country in a very unstable climate. The Russian peasants, first of all, were not overloaded by problems of breeding livestock. It was too big and risky a business to increase the herd as this required much greater fodder reserves for wintering. By limiting livestock numbers the peasants did not have to worry about acute fodder shortages if a poor harvest occurred. Indeed, Russian farmers received only small amounts of manure and had to rely mostly on the size of the crop area rather than raising productivity. Cereals were a more suitable crop for this as they were extensively farmed. Peasants were able to sow large areas, even if this caused the quality of the soil to deteriorate. The Russian peasants knew that there were new, unploughed lands located somewhere in the south and east of their homeland.

The “survivor” strategy for the country would suggest the territorial expansion of arable land despite some having low potential productivity. The larger crop area in the country the less the chance that all main growing regions would face adverse weather conditions at the same time. Food crises could occur in years of bad harvest, but only if problems emerged in terms of the transportation of agricultural produce from wealthier regions to those suffering from droughts. The mass famine of 1891 was such a case. In the pre-revolutionary decades Siberia became a very important buffer region in years of crop failure in European Russia.

The “survivor” strategy dominated until the mid-1960s. In the Stalin era the increase in area under cereals was the most important target for the new collectivized agriculture. Bread was the major food staple in the diet of the Soviet people, while meat and dairy consumption were at the pre-revolutionary level. All mass famines that occurred in years of crop failure were mainly the result of a deliberately conducted anti-peasant policy on the part of the Communist leadership. This policy (for example, restricting the migration of peasants from affected areas) left millions of Russian peasants with no chance of avoiding famine. No doubt, none of the mass famines in the Stalin era would have occurred if the state policy had been more humane.

In the mid-1950s, Nikita Khrushchev launched a grandiose plan for the ploughing up of 42 million hectares of the “virgin lands” in Kazakhstan and Western Siberia. The plan turned out to be a fiasco. None of the planned targets were achieved. The “virgin lands” suffered from wind erosion and supported low, unstable, and economically unprofitable (for new grain sovkhozes) cereal production. This is true only from the position of the “advancer”. For example, the forest zone of Central Russia could not compete with the Ukraine or North Caucasus in terms of profitability, where expenditures on grain production were low. In the Soviet era this difference in the cost of grain production was compensated by the higher state purchase price for grain produced in the forest zone as compared with the steppe regions of the country. Despite very low yields and the unstable character of the harvests, the “virgin lands”, in some years, acted as a buffer region when other traditional areas suffered from weather problems. Unfortunately, in 1963 and 1965 grain crises could not be avoided when poor harvests occurred simultaneously in the virgin lands and traditional agricultural regions. It proved afterwards to be a rare event, but it cost Khrushchev his career. The food crises of the 1960s emerged because of a reluctance to accept

the very idea of large purchases of grain from abroad and because the Soviet government favored the restriction of grain supplies to the population and livestock sector.

From the mid-1960s, major efforts to transform Russian agriculture into modernized and labor-intensive farming were undertaken by the Brezhnev government. The main target was radically to raise livestock production. New industrial-style livestock complexes were constructed around the country. More grain was allocated for the stable supply of these complexes. However, the shortage of other varieties of fodder became a major challenge that the Soviet Union completely failed to address. Here, the complicated geographical condition of Russia proved to be a determining factor, especially in the case of hayfield and pastureland productivity. For 50 years the total fodder production on a per head basis did not noticeably increase. Despite the allocation of the largest investments in the world, the Soviet Union's achievements were modest. When the crops failed, which happened as frequently as once every three years, fodder crises occurred. In order to avoid the massive slaughtering of animals and to maintain some growth of the herd, the Soviet Union could not help but import large amounts of feed grain from Western countries. The chronic character of grain imports shows the increasing vulnerability of the country to oscillations in the weather, which prevented it from becoming self-sufficient in food production. The food problems also became permanent and obsessive for the Soviet authorities. Large amounts of produce were lost somewhere on the way from the field to the final consumer. All these problems indicate a major failure in the attempt to follow the "advancer" model for Russian farming.

Today, Russian agriculture still dreams of being the "advancer", but the actual transformation is to increase grain production and radically reduce livestock inventories. The decline in livestock inventories of more than 40 percent, which happened during the 1990s, is comparable only with that of wartime. There are no fodder resources in many regions of Russia, while the planting or importing of roots or silage has been made unprofitable by low livestock productivity and low purchase prices. The current grain balance, which allows for the export of part of the grain produced, is only due to low domestic demand. The most negative aspects are connected with the lack of a state subsidy for Russian agriculture, including the grain production sector. This means that many central regions find themselves unable to grow any more cereals as the cost is higher than buying and transporting the cereals from southern

regions of Russia. A reduction in the sown area in the forest zone will be the main result. However, from the position of the “survivor” it becomes risky for a country with a very unstable climate to limit its harvest geographically. Some models of climate change show that the main agricultural zone of Russia will experience more frequent droughts while average weather conditions will become milder in the non-productive zone. However, because of the low quality of the soil, the shortage of arable land suitable for cereal growing, and a lack of infrastructure, it is unlikely that the forest zone would replace the steppe regions as the main cereal-growing area. Thus the problem is to increase the sustainability of Russian agriculture overall, at least in relation to such important crops as cereals, in the face of the future potential deterioration of the climate in a number of agricultural regions.

It is difficult to imagine a situation in the future in which Russian agriculture will be entirely free of problems. Anomalies in the climate are likely to increase, making it difficult to regulate production and yields with as much certainty as currently exists in many Western countries.

Glossary

BIOLOGICAL YIELD—provisional estimate of yield based on field studies of crops in spring or early summer.

CENTNER—unit of weight equaling 100 kilograms, widely used in Russian agricultural statistics.

CONSUMPTION REGIONS—central and northern regions of Russia which are not self-sufficient in food production and have to import considerable amounts of grain (for human and animal consumption) and other produce from southern regions of the country.

ECONOMIC REGIONS—the main administrative units of Russia are oblasts and republics. However, for economic (for example, for the presentation of statistical data) purposes the country was generally divided into larger units, so-called economic regions. Nowadays the RSFSR is divided into 11 large economic regions (see also endnote 2 to Chapter 1).

FEED UNIT—for the evaluation of fodder availability, the total amount of a particular animal feed is recalculated in units equivalent to one kilogram of oats in terms of calorific value. For example, for pasture grass the coefficient is 0.14. This means that the calorific value of one kilogram of grass equals only 0.14 kilograms of oats.

GOSPLAN—abbreviation for the State (*Gosudarstvennyi*) Planning (*Planirovaniya*) Commission, the center of planing, coordination, and everyday management of the all-union ministries in the USSR.

GRAIN DELIVERY, GRAIN COLLECTION—amount of grain harvest sold (or delivered as levy) to the state.

KOLKHOZ—abbreviation for collective (*kollektivnoe*) farm (*khozyastvo*), the main agricultural unit in the Soviet Union. These combined several peasant families from one or several compactly located villages. In contrast to sovkhozes, kolkhozes were designed as self-contained organizations in terms of financial resources.

- KULAK—in the 1920s and 1930s, the name for a rich peasant, that is, one who possessed a larger than average plot or large numbers of livestock.
- MARKETABILITY—productivity (efficiency) of a farm measured by the share of harvest produced for selling on the market.
- MGLA—haze or strong dust storm.
- MTS—abbreviation for Machine Tractor Station (see endnote 1 to Chapter 5).
- OBLASTS—the major administrative unit of the Russian Federation. There are 89 oblasts and national republics in modern Russia, each of them combining several dozens of smaller units, or *raions* (districts).
- PRODUCTIVE REGIONS—the main agricultural regions of Russia located in steppe and wooded steppe zones and supplying grain and other agricultural products to mainly industrialized and urbanized central and northern regions of Russia. The latter are named consumption regions. This division was established in the late nineteenth century for statistical and administrative purpose and is still in use today.
- PUD—traditional Russian unit of weight equaling 16.5 kilograms.
- RSFSR—abbreviation for the Russian Soviet Federative Socialistic Republic, the largest republic in the USSR.
- SAMIZDAT—informal dissident source of information. Literally self (*sam*) publishing (*izdat*’).
- SOVKHOZ—abbreviation for soviet (*Sovetskoe*) farm (*khozyastvo*), a large agricultural unit in the Soviet Union, constructed on the pattern of a state industrial enterprise. Peasants working in sovkhozes were employed (from different regions) by the state and received fixed salaries.
- STANDARD UNIT—used for comparison in livestock statistics to measure the overall size of the livestock inventory in terms of cattle equivalents, suggesting, for example, that a pig equals 0.6 of the weight of cattle.
- SUKHOVEI—literally dry (*sukhoe*) breath (*veyanie*). These are dry winds that cause crop problems. Often these winds have a high velocity as they originate on the periphery of anticyclones.
- TSSK—abbreviation for the Central (*Tsentral’ny*) Statistical (*Statisticheskyy*) Committee (*Komitet*), the main statistical body, first set up in the late nineteenth century in the Russian Empire. Later this committee was repeatedly renamed and the current successor is known

as the *Goskomstat*, or the State Committee on Statistics (*Gosydarstvenny Komitet po Statistike*).

ZEMSTVO—in the Russian Empire these were units of local government, elected on a restricted franchise. They were established as part of the political and economic reforms aimed at the abolition of peasant serfdom in 1861. The target of the establishment of the *zemstva* was to develop regional administrative independence.

References

- Alcamo, J. et.al., 2003. Will Climate Change Affect Food and Water Security in Russia? Summary Report on the International Project on Global Environmental Change and Its Threat to Food and Water Security in Russia. Available from: Center for Environmental Systems Research, University of Kassel, Germany, Report No. A0302.
- “A preliminary look at Soviet agriculture in 1980: livestock”. 1980. *Radio Liberty Research*. 1 December.
- “A time of troubles for the Soviet economy.” 1972. *Radio Liberty Research*. 20 December.
- “Administered prices reintroduced at kolkhoz market.” 1969. *Radio Liberty Research*. 7 July.
- Agitator*. 1982. (In Russian.) N16.
- Agroklimaticheskyy prognoz i issledovanie zasukhi v 1975* (Agroclimatic forecasting and observation of the drought of 1975). 1978. (In Russian.) Gidrometeoizdat, Moscow.
- Alexandrov, I. K. 1982. (In Russian.) “Snizhenie energoemkosti elektrifizirovannykh razdatchikov.” In: *Mechanizatsia i elektrofikatsiia sel'skogo khozyastvo* (The mechanization and electrification of agriculture). N3.
- Andreev, E. M., L. E. Darsky and T. L. Khar'kova. 1998. (In Russian.) *Demographicheskaya istoriya Rossii: 1927–1959* (Demographic history of Russia: 1927–1959). Informatika, Moscow.
- Apple, R. W. 1981. “Food supplies in the USSR erratic and scanty”. *Radio Liberty Research*. 8 February.
- Bakinsky Rabochiy*. 1980. (In Russian.) 19 December.
- Baltimore Sun*. 1978. 18 September.
- Baltimore Sun*. 1981. 2 September.
- Baltimore Sun*. 1986. 17 August.
- Balzak, S. S., V. F. Vasyutin and Ya. G. Feigin. 1952. *Economic geography of the USSR*. New York.
- Berelovich, A. and B. Danilov (eds.). 2000a, b. (In Russian.) *Sovetskaya derevnya glazami VChK-OGPU-NKVD: 1918–1939* (The Soviet village through the eyes of VChK-OGPU-NKVD: 1918–1922). Vols. 1 and 2. ROSSPEN, Moscow.
- Bor'ba s zasukhoi i golodom* (Fighting against drought and famine). 1925. (In Russian.) Moscow–Leningrad.

- Bryan, P. 1971. "The Soviet feed grain crisis." *Radio Liberty Research*. 16 December.
- Bryan, P. 1973. "Important grain figures released for RSFSR in 1973." *Radio Liberty Research*. 12 December.
- Buchinsky, I. E. 1974. (In Russian.) *Zasukhi i sukhovei* (Droughts and *sukhovei*). Gidrometeoizdat, Leningrad.
- Bulletin of the USDA*. 1971. 29 November.
- Bulletin of the USDA*. 1978. August.
- Bulletin of WMO*. 1978. Vol. 27, N3-4.
- Bulletin of WMO*. 1979. Vol. 28, N3-4.
- Bulletin of WMO*. 1980. Vol. 29, N3-4.
- Bulletin of WMO*. 1981. Vol. 30, N3-4.
- Bulletin of WMO*. 1982. Vol. 31, N3-4.
- Bulletin of WMO*. 1983. Vol. 32, N3-4.
- Bulletin of WMO*. 1985. Vol. 34, N3-4.
- Bulletin of WMO*. 1986. Vol. 35, N3-4.
- Bulletin of WMO*. 1989. Vol. 38, N3-4.
- Bush, K. 1964. "The retail prices of goods and services in New York, Moscow, London, Paris and Munich, mid-July, 1964." *Radio Liberty Research*. 17 August.
- Bush, K. 1964. "The Profitability of the Virgin Lands". *Radio Liberty Research*. 25 August.
- Bush, K. 1971. "The statistical yearbook for 1969." *Radio Liberty Research*. 15 January.
- Bush, K. 1972. "The retail prices in Moscow and in four Western cities in November 1971." Supplement to the research bulletin. *Radio Liberty Research*. 19 April.
- Bush, K. 1974. "Soviet Agriculture: Ten Years under New Management." In: Z. M. Fallenbuche (ed.). *Economic Development in the Soviet Union and Eastern Europe*. Vol. 2, New York: 157-204.
- Bush, K. 1975. "Soviet economic growth: past, present and projected." *Radio Liberty Research*. 12 September.
- Bush, K. 1975. "Mother Nature and the USSR Gosplan." *Radio Liberty Research*. 4 December.
- Bush, K. 1976. "The retail prices in Moscow and in four Western cities in May 1976." Supplement to the research bulletin. *Radio Liberty Research*. 16 June.
- Capcelea, A. 1996. *The republic of Moldova on the way to the sustainable development*. Chisinau.
- "Cattle numbers rise in East Europe. The private sector a decisive support." 1967. *Radio Liberty Research*. 28 June.
- Chelintsev, A. N. 1922. (In Russian.) *Vvedenie. Otchet o statisticheskikh dannyx po organizatsii krestyanskix khozyastv na Ukraine i v sosednix raionax* (Introduction. Report on statistics data on the organization of peasant farms in the Ukraine and neighboring regions). Moscow.
- Chelintsev, A. N. 1928. (In Russian.) *Russkoe celskoe khozyastvo pered revoliutsiei* (Russian agriculture before the revolution). Moscow.

- Chicago Tribune*. 1979. 23 March.
Chicago Tribune. 1981. 7 December.
Chicago Tribune. 1982a. 24 January.
Chicago Tribune. 1982b. 29 January.
Chicago Tribune. 1986a. 9 May.
Chicago Tribune. 1986b. 15 July.
Christian Science Monitor. 1965. 26 November.
Christian Science Monitor. 1970. 5 June.
Christian Science Monitor. 1981. 10 July.
Christian Science Monitor. 1984. 15 October.
Chugunov, T. 1964. "Animal husbandry in 1963". *Radio Liberty Research*. 12 February.
Conquest, R. 2002. *The Harvest of Sorrow. Soviet Collectivization and the Terror-Famine*. London.
"Critical situation in the food sector." 1977. *Radio Liberty Research*. 4 May.
Daily Telegraph. 1962. 7 August.
Daily Telegraph. 1979a. 8 February.
Daily Telegraph. 1979b. 14 August.
Daily Telegraph. 1981. 2 January.
Daily Telegraph. 1982. 9 June.
Davies, R. W. 1980. *The Collectivization of Soviet Agriculture, 1929–30*. Macmillan Press Ltd., New York.
Davies, R. W. and S. G. Wheatcroft. 2004. *The Years of Hunger: Soviet Agriculture, 1931–33*. Macmillan, New York.
Davies, R. W., M. Harrison and S. G. Wheatcroft (eds.). *The Economic Transformation of the Soviet Union. 1913–1945*. Cambridge University Press, Cambridge: 216–237.
Desai, M. 1989. "Modeling an Early-Warning System for Famines." In: Jean Dreze, and J. and A. Sen (eds.). *Hunger and Public Action*. Clarendon Press, Oxford.
"Difficulties in the Altai virgin land." 1963. *Radio Liberty Research*. 1 April.
"Difficulties of implementation of the food program." 1982. *Radio Liberty Research*. 16 February.
Dobb, M. 1966. *Soviet Economic Development since 1917*. New York.
Dronin, N. M. and A. P. Kirilenko. 2003. "Climatic and political factors in agricultural performance in Russia." In: *Global and regional land use/cover changes international geographic union*. IGU-LUCC Workshop. Moscow 18–20 July.
"Dust storms and the grit of Ukrainian politics." 1969. *Radio Liberty Research*. 28 February.
"Dust storms in the USSR." 1960. *Radio Liberty Research*. September.
Economist. 1964. 1 February.
Economist. 1977. 15 January.
Economist. 1981. 26 December.
Ekonomicheskaya Gazeta. 1967. (In Russian.) N 25.
Ekonomicheskaya Gazeta. 1978. (In Russian.) 16 August.
Ekonomika sel'skogo Khozyastva (Economy of agriculture). 1962. N6: 11.

- Ekonomika sel'skogo Khozyastva* 1967. (In Russian.) N7.
- Ekonomika sel'skogo Khozyastva* (Economy of agriculture). 1971. (In Russian.) N10.
- Ekonomika sel'skogo Khozyastva* (Economy of agriculture). 1972. (In Russian.) N5.
- Ekonomika sel'skogo Khozyastva* (Economy of agriculture). 1976. (In Russian.) N1.
- Ekonomika sel'skogo Khozyastva* (Economy of agriculture). 1978. (In Russian.) N8.
- Ekonomika sel'skogo Khozyastva* (Economy of agriculture). 1980. (In Russian.) N11.
- "Emergency expansion in the 'new lands'". 1972. *Radio Liberty Research*. 2 May.
- "Encouragement of factory farm holdings recalls 1930s." 1979. *Radio Liberty Research*. 22 January.
- "Erosion Losses Described". 1966. *Radio Liberty Research*. 15 June.
- Field, N. C. 1968. "Environmental quality and land productivity: a comparison of the agricultural land base of the USSR and North America." *Canadian Geographer*, XII: 1–14.
- Financial Times*. 1980. 2 July.
- Financial Times*. 1985. 16 May.
- Financial Times*. 1987. 26 November.
- "Food shortage in the USSR." 1980. *Radio Liberty Research*. 18 June.
- "Food situation in Leningrad during summer 1978." 1978. *Radio Liberty Research*. August.
- "Food supply in the USSR: clear signs of improvement." 1984. *Radio Liberty Research*. 1 September.
- "Food supply situation in Moscow, Leningrad and Minsk in 1977." 1978. *Radio Liberty Research*. 9 January.
- Foreign Agricultural Circular: Grains. USSR agricultural situation. Review of 1976 and Outlook for 1977*. 1976. USDA.
- Foreign Agriculture Circular*. 1978. USDA. August.
- Foreign Agriculture Circular*. 1979. USDA. October.
- Foreign Agriculture Circular*. 1980. USDA. June.
- Frankfurt Allgemeine Zeitung*. 1982. 2 February.
- "Further Soviet imports of Western grain?" 1969. *Radio Liberty Research*. 2 May.
- Gamburtsev, S. 1961. "Some results of the further development of the livestock sector in the USSR in 1960". *Radio Liberty Research*. 20 January.
- Gatrell, P. 1986. *Tsarist Economy (1850–1917)*. London.
- Gatrell, P. 1994. "The First World War and War Communism (1914–20)". In: R. W. Gatrell, P. 2000. (In Russian.) "'Bednaya' Rossiya: rol' prirodnogo okruzheniya i deyatelnosti pravitel'stva v dolgovremennoi perspektive v ekonomicheskoi istorii Rossii" ("Poor" Russia: the role of environmental and governmental management in the long-term prospects of the economic history of Russia). In: V. A. Vinogradov (ed.) *Ekonomicheskaya istoriya Rossii XIX–XX vv: sovremennyy vsglyad* (Economic history of Russia in the XIX–XX centuries: a modern view). ROSSPEN, Moscow: 206–253.

- Goldman, M. I. 1968. *The Soviet economy: Myth and Reality*. New York.
- Golikov, B. A. (ed.). 1975. (In Russian.) *Sovetskii Souz. Statisticheskii spravochnik*. (The Soviet Union. Statistical Report). Politizdat, Moscow.
- Golubovsky, M. D. (ed.) 1991. (In Russian.) *A. A. Lubishev. V zashity nauki. Kommentarii*. (A. A. Lubishev. To protect science. Notes). Nauka, Lenin-grad.
- "Grain cutback to unsettle high-priority Soviet effort." 1980. *Radio Liberty Research*. 13 July.
- Grankshaw, Ed. 1959. *Khrushchev's Russia*. London.
- Gregory, P. 1992. "Rents, land prices and economic theory: the Russian agriculture crisis." In: L. Edmondson, and P. Waldron (eds.) *Economy and Society in Russia and the Soviet Union, 1860–1930*. London: 6–23.
- Guardian*. 1963. 25 October.
- Guardian*. 1980. 5 August.
- Guardian*. 1982. 25 August.
- Guardian*. 1986. 2 January.
- Guardian*. 1987. 21 May.
- Hanson, P. 1984. "Brezhnev's Economic Legacy." In: *The Soviet Economy after Brezhnev*. NATO Colloquium, 11–13 April. Brussels: 41–81.
- Hanson, P. 1985. "Gorbachev in Tselinograd: Agricultural policy under scrutiny." *Radio Liberty Research*. 12 September.
- Harrison, M. 1994. "The Second World War." In: R. W. Davies, M. Harrison and S. G. Wheatcroft (eds.). *The Economic Transformation of the Soviet Union, 1913–1945*. Cambridge University Press: 238–264.
- International Herald Tribune*. 1969. 13 April.
- International Herald Tribune*. 1980. 25 July.
- Izvestia*. 1960. (In Russian.) 10 April.
- Izvestia*. 1962. (In Russian.) 28 June.
- Izvestia*. 1964. (In Russian.) 18 October.
- Izvestia*. 1967. (In Russian.) 2 February.
- Izvestia*. 1970a. (In Russian.) 29 September.
- Izvestia*. 1970b. (In Russian.) 27 October.
- Izvestia*. 1974a. (In Russian.) 6 May.
- Izvestia*. 1974b. (In Russian.) 18 May.
- Izvestia*. 1976. (In Russian.) 27 January.
- Izvestia*. 1978. (In Russian.) 23 December.
- Izvestia*. 1980a. (In Russian.) 18 October.
- Izvestia*. 1980b. (In Russian.) 22 November.
- Izvestia*. 1981a. (In Russian.) 18 June.
- Izvestia*. 1981b. (In Russian.) 16 July.
- Izvestia*. 1981c. (In Russian.) 25 August.
- Izvestia*. 1981d. (In Russian.) 3 September.
- Izvestia*. 1983a. (In Russian.) 17 February.
- Izvestia*. 1983b. (In Russian.) 13 March.
- Izvestia*. 1984. (In Russian.) 22 September.
- Izvestia*. 1985. (In Russian.) 13 January.
- Izvestia Akademii Nayk. Seria Geographii*. 1961. (In Russian.) N.1.

- Johnson, G. 1955. "Analysis of Khrushchev's report on livestock produce". Agricultural Economic Research, University of Chicago. *Radio Liberty Research*. 25 January.
- Journal of Commerce*. 1971. 9 March.
- Journal of Commerce*. 1979. 7 February.
- Journal of Commerce*. 1981a. 11 May.
- Journal of Commerce*. 1981b. 17 July.
- Journal of Commerce*. 1982. 20 August.
- Karasev, I. I. 1951. (In Russian.) *Organizatsiya kormovoi bazy* (Organizing of the fodder base). Sel'khozgiz, Moscow.
- Karez, J. F. 1967. "Thoughts on the grain problem". *Soviet Studies*. April: 402–406.
- Kazakhstanskaya Pravda*. 1956. (In Russian.) 31 January.
- Kazakhstanskaya Pravda*. 1959. (In Russian.) 25 March.
- Kazakhstanskaya Pravda*. 1960. (In Russian.) 22 January.
- Kazakhstanskaya Pravda*. 1963. (In Russian.) 11 June.
- Kazakhstanskaya Pravda*. 1963. (In Russian.) 14 June.
- Khomiyakov, P. M. et al. 2001. (In Russian.) *Vliyanie globalnogo izmeneniya klimata na funktsionirovaniye osnovnykh sektorov ekonomiki i zdorovie naseleniya Rossii* (The impact of global climate changes on the functioning of major sectors of the economy and the health of the population of Russia). Moscow.
- Khrushchev, N. S. 1962. (In Russian.) "The construction of Communism and the development of agriculture". In: *Speeches and documents*. Vol. 1. Moscow: 85–100.
- Kiselev, A. F. and E. M. Shagin (eds.). 1996. (In Russian.) *Khrestomatiya po otechestvennoi istorii: 1946–93* (Materials on the country's history: 1946–93). Moscow.
- Kochetkov, I. V. 2000. (In Russian.) "Zernovoe proizvodstvo v gody NEPa: deistvitel'nost' i vozmozhnosti" (Grain production in the period of NEP: reality and possibilities). In: V. A. Vinogradov (ed.). *Ekonomicheskaya istoriya Rossii XIX–XX vv: sovremennyy vsglyad* (Economic history of Russia in the XIX–XX centuries: a modern view). ROSSPEN, Moscow: 80–104.
- Kokol, N. 1962. "The So-called Virgin Lands of Kazakhstan." *Radio Liberty Research*.
- Kommunist*. 1958. (In Russian.) N. 18.
- Kommunist*. 1985. (In Russian.) 1 January.
- Komsomolskaya Pravda*. 1964. (In Russian.) 23 June.
- Komsomolskaya Pravda*. 1969a. (In Russian.) 19 July.
- Komsomolskaya Pravda*. 1969b. (In Russian.) 6 August.
- Komsomolskaya Pravda*. 1974. (In Russian.) 28 December.
- Kont, F. (ed.) 1994. (In Russian.) *Chronologia Rossiiskoi istorii* (Chronology of Russian history). Moscow.
- Kronner, A. 1980. "The situation concerning supply of the population with livestock products in the USSR." *Radio Liberty Research*. 25 August.
- Kruchkov, B. G. and L. I. Rakovskaya. 1990. (In Russian.) *Zernovoe khozyastvo: territorial'naya organizatsiya i effektivnost' proizvodstva* (Grain production: territorial organization and farming efficiency). MSU, Moscow.

- Lappo, G. M., V. I. Kozlov and N. I. Mikhailov (eds.). 1983. (In Russian.) *Strany i Narody. Sovetskii Souz* (Countries and peoples. The Soviet Union). Mysl, Moscow.
- Le Monde* (In French.) 1981. 4 December.
- "Lean times ahead for Soviet meat eaters?" 1980. *Radio Liberty Research*. 3 April.
- Leningradskaya Pravda*. 1973. (In Russian.) 21 August.
- Literaturnaya Gazeta*. 1961. (In Russian.) 8 April.
- "Local leaders detail food shortages, industrial shortfalls." 1980. *Radio Liberty Research*. 9 January.
- London Times*. 1980. 31 October.
- London Times*. 1988. 4 May.
- Los Angeles Times*. 1981a. 19 February.
- Los Angeles Times*. 1981b. 14 August.
- Lubny-Gertsik, L. 1925. (In Russian.) "O izbytochnom trude v selskom khozyastve SSSR" (On excessive labor in agriculture in the USSR). In: *Sel'skoe khozyastvo na putyax vosstanovleniya* (Agriculture on the way to recovery). Moscow: 338–368.
- Lyashchenko, P. I. 1949. *History of the national economy of Russia to the 1917 Revolution*. New York.
- Maistrenko, I. 1962. "The situation in the livestock sector." *Radio Liberty Research*. 2 February.
- Makarets, L. I. and M. N. Makarets. 2002. (In Russian.) *Ekonomika sel'skokhozyaystvennoi produktsii* (Economy of agricultural production). St. Petersburg.
- Manchester Guardian*. 1966. 3 July.
- "Masherov expresses alarm over feed situation." 1979. *Radio Liberty Research*. 21 June.
- Maslov, P. 1930. (In Russian.) *Perenaselenie Russkoi derevni* (Overpopulation in Russian villages). Moscow–Leningrad.
- Materialy XXIV s'ezda KPSS* (Materials of XXIV Congress of the CPSU). 1971. (In Russian.) Politizdat, Moscow.
- Mechanizatsia i elektrofikatsiya sel'skogo khozyastvo* (Mechanization and electrification of agriculture). 1982. (In Russian.) N3.
- Mesherskaya, A. A. and B. G. Blashevich. 1990. (In Russian.) *Katalog temperaturnykh i vlazhnostnykh kharakteristik s raschetom ploshadei rasprostraneniya po ekonomicheskim raionam glavnoi produktivnoi zony SSSR: 1891–1983* (Catalogs of temperature and humidity characteristics with an account of areas of spread in economic regions of the main productive zone of the USSR: 1891–1983). Gidrometeoizdat, Leningrad.
- Milov, L. V. 2001. (In Russian.) *Velikorussky pakhar' i osobennosti rossiiskogo istoricheskogo protsessa* (Russian ploughmen and the specifics of the Russian historical process). ROSSPEN, Moscow.
- "Mistakes in the Exploitation of the Virgin Lands." 1967. *Radio Liberty Research*. 6 September.
- Mondich, M. 1963. "Fear of famine and panic buying in the USSR." *Radio Liberty Research*. 17 October.

- "More Data on Dust Storms in the Virgin Lands." 1963. *Radio Liberty Research*. 24 June.
- Moscow News*. 1966. (In Russian.) 17 September.
- Moscow News*. 1967. (In Russian.) 8 April.
- Moscow News*. 1978. (In Russian.) 1 March.
- Moshkov, J. A. 2002. (In Russian.) "Sovetskoe khozyastvo i krestyanstvo v sere-dine 1930–x godov" (Soviet agriculture and the peasantry in the mid-1930s). In: L. Viola, V. Danilov and R. Manning (eds.). *Tragediya sovetskoi derevni: kollektivizatsiya i raskulachivanie: 1927–1939* (The tragedy of the Soviet village: 1927–1939). Vol. 4. ROSSPEN, Moscow: 7–38.
- Moskovskaya Pravda*. 1980. (In Russian.) 15 February.
- "Much of the USSR's imported grain lost in transit." 1982. *Radio Liberty Research*. 16 September.
- Narodnoe khozyastvo SSSR in 1922–1982* (People's economy of the USSR, 1922–82). 1982. (In Russian.) Moscow.
- Narodnoe khozyastvo SSSR v 1959* (People's economy of the USSR, 1959). 1960. (In Russian.) Finansovaya statistika, Moscow.
- Narodnoe khozyastvo SSSR v 1960* (People's economy of the USSR in 1960). 1961. (In Russian.) Finansovaya statistika, Moscow.
- Narodnoe khozyastvo SSSR v 1961* (People's economy of the USSR, 1961). 1962. (In Russian.) Finansovaya statistika, Moscow.
- Narodnoe khozyastvo RSFSR v 1965* (People's economy in the RSFSR, 1965). 1966. (In Russian.) Moscow.
- Narodnoe khozyastvo SSSR v 1970* (People's economy of the USSR, 1970). 1971. (In Russian.) Finansovaya statistika, Moscow.
- Narodnoe khozyastvo RSFSR v 1971* (People's economy in the RSFSR, 1971). 1972. (In Russian.) Moscow.
- Narodnoe khozyastvo SSSR v 1990* (People's economy of the USSR, 1990). 1991. (In Russian.) Finansovaya statistika, Moscow.
- Narodnoe khozyastvo SSSR v 1941–45* (People's economy of the USSR, 1941–1945). 1959. (In Russian.) Moscow.
- Narodnoe khozyastvo v RSFSR v 1981* (People's economy of the RSFSR in 1981). 1982. (In Russian.) Finansy i Statistika, Moscow.
- Narodnoe khozyastvo v RSFSR v 1983* (People's economy of the RSFSR in 1983). 1984. (In Russian.) Finansy i Statistika, Moscow.
- Narodnoe khozyastvo SSSR v 1985* (People's economy of the USSR in 1985). 1986. (In Russian.) Finansovaya statistika, Moscow.
- Narodnoe khozyastvo v RSFSR v 1987* (People's economy in the RSFSR in 1987). 1988. (In Russian.) Moscow.
- Narodnoe khozyastvo v RSFSR v 1988* (People's economy of the RSFSR in 1988). 1989. (In Russian.) Goscomstat, Moscow.
- Narodnoe khozyastvo SSSR v 1989* (People's economy of the USSR in 1989). 1990. (In Russian.) Finansovaya statistika, Moscow.
- Naselenie Rossii za sto let: 1897–1997: statisticheskii sbornik* (Population of Russia for the last hundred years: 1897–97: statistical report). 1998. (In Russian.) Goscomstat, Moscow.
- "New RSFSR laws limit urban livestock ownership." 1963. *Radio Liberty Research*. 20 May.

- "New Statistics on the Virgin Lands." 1972. *Radio Liberty Research*. 18 April.
- New York Herald Tribune*. 1962. 31 October.
- New York Times*. 1963. 13 September.
- New York Times*. 1964. 24 February.
- New York Times*. 1964. 10 March.
- New York Times*. 1982a. 15 January.
- New York Times*. 1982b. 15 December.
- New York Times*. 1984. 28 August.
- New York Times*. 1988. 10 July.
- Newsweek Magazine*. 1980. 7 July.
- Newsweek Magazine*. 1981. 9 November.
- Nove, A. 1969. *The Soviet Economy*. New York.
- Oganovsky, N. 1927. (In Russian.) "Upadok, vosstanovlenie i rekonstruktsiya selskogo khozyastvo v 1917–1927" (Decline, restoration and reconstruction of agriculture between 1917–1927). *Economic Review*. Moscow.
- Opyt predvaritelnogo analiza vosmi katastroficheskix zasyyx za poslednii sorok let* (Experience of preliminary analysis of the eight catastrophic droughts of the last forty years). 1933. (In Russian.) Part 1. TsUEG, Moscow.
- Otchet Imperatorskogo Russkogo geographicheskogo obshestva na 1894* (Report of the Imperial Russian Geographical Society for 1894). 1895. (In Russian.) St. Petersburg.
- Otchet Zapadnosibirskogo otdela Imperatorskogo Russkogo geographicheskogo obshestva na 1893* (Report of the Western Siberian branch of the Imperial Russian Geographical Society for 1893). 1894. (In Russian.) St. Petersburg.
- "Outlook for the 1969 grain harvest." 1969. *Radio Liberty Research*. 21 April.
- Parker, W. N. 1972. *The Superpowers. The United States and the Soviet Union Compared*. New York.
- Pelt, N. N. (ed.) 1959. (In Russian.) *Kormovaya baza zhivotnovodstva SSSR i puti ee razvitiya* (Feeding resources for the livestock of the USSR and their development). *Academiya Nauk SSSR*, Moscow.
- Philips, A. 1980. "Russians face prospect of major reduction in meat supplies." *Foreign Agriculture*. 25 January.
- Planovoe khozyastvo*. 1969. (In Russian.) N12.
- Pokazateli sotsialnogo razvitiya Rossiiskoi Federatsii i ee regionov* (Indicators of social development of the Russian Federation). 1993. (In Russian.) Goskomstat, Moscow.
- Polaykov, U. A. (ed.) 2000. (In Russian.) *Naselenie Rossii v XX veke* (The population of Russia in the XX century). Vol. 1. ROSSPEN, Moscow.
- Popluiko, A. 1962. "Soviet and American agriculture systems." *Radio Liberty Research*. 4 December.
- Popluiko, A. 1964. "How bad was the harvest of 1963?" *Radio Liberty Research*. 8 June.
- Popov, P. 1925. (In Russian.) "Khlebophurazhny balans i potreblenie (1840–1924)" (The balance of food and feed grain production and consumption [1840–1924]). In: *Sel'skoe khozyastvo na puti vosstanovleniya* (Agriculture on the way to recovery). Moscow.

- Popov P. 1950. (In Russian.) "Pokazateli zasushlivosti klimata uzhnykh raionov Ukrainy" (Indicators of the aridity of the climate of southern areas of the Ukraine). In: *Agroklimaticheskie usloviya stepei Ukrainskoi SSR i puti ulucheniya ix* (The agroclimatic conditions of the steppes of the Ukrainian SSR and ways to improve them). Academy of Sciences of the Ukrainian SSR, Kiev.
- "Posev". 1963. (In Russian.) *Radio Liberty Research*. 22 November.
- Posev, 1979. (In Russian.) N 10.
- Posevnye ploshadi SSSR. Statisticheskii spravochnik (Crop areas. Statistical report). 1957. (In Russian.) Moscow.
- Pravda. 1954. (In Russian.) 21 March.
- Pravda. 1961. (In Russian.) 12 January.
- Pravda. 1961. (In Russian.) 24 November.
- Pravda. 1962. (In Russian.) 10 June.
- Pravda. 1962. (In Russian.) 12 September.
- Pravda. 1963. (In Russian.) 18 March.
- Pravda. 1963. (In Russian.) 10 May.
- Pravda. 1963. (In Russian.) 3 November.
- Pravda. 1964. (In Russian.) 24 January.
- Pravda. 1964. (In Russian.) 3 December.
- Pravda. 1964. (In Russian.) 16 December.
- Pravda. 1964. (In Russian.) 21 December.
- Pravda. 1966. (In Russian.) 12 October.
- Pravda. 1969a. (In Russian.) 31 March.
- Pravda. 1969b. (In Russian.) 12 May.
- Pravda. 1970a. (In Russian.) 13 January.
- Pravda. 1970b. (In Russian.) 18 July.
- Pravda. 1970c. (In Russian.) 2 September.
- Pravda. 1970d. (In Russian.) 4 September.
- Pravda. 1970e. (In Russian.) 2 November.
- Pravda. 1970f. (In Russian.) 25 December.
- Pravda. 1971a. (In Russian.) 18 January.
- Pravda. 1971b. (In Russian.) 23 January.
- Pravda. 1971c. (In Russian.) 26 April.
- Pravda. 1972. (In Russian.) 27 April.
- Pravda. 1976a. (In Russian.) 3 November.
- Pravda. 1976b. (In Russian.) 6 December.
- Pravda. 1977. (In Russian.) 8 January.
- Pravda. 1977. (In Russian.) 3 February.
- Pravda. 1978a. (In Russian.) 3 January.
- Pravda. 1978b. (In Russian.) 2 June.
- Pravda. 1978c. (In Russian.) 17 June.
- Pravda. 1979. (In Russian.) 8 December.
- Pravda. 1980a. (In Russian.) 21 May.
- Pravda. 1980b. (In Russian.) 17 October.
- Pravda. 1980c. (In Russian.) 9 December.
- Pravda. 1981. (In Russian.) 13 July.

- Pravda*. 1984. (In Russian.) 1 April.
- Pravda*. 1987. (In Russian.) 29 October.
- Pravda*. 1988a. (In Russian.) 8 February.
- Pravda*. 1988b. (In Russian.) 12 May.
- Pravda*. 1989. (In Russian.) 23 August.
- "Pravda dissatisfied with virgin lands harvest." 1966. *Radio Liberty Research*. 24 October.
- Pravda Ukrainy*. 1988. (In Ukrainian.) 16 April.
- Problemy selskogo khozyastva v Severnom Kazakhstane i stepnykh raionakh Zapadnoi Sibiri* (Problems in agriculture in Northern Kazakhstan and the steppe regions of Western Siberia). 1967. (In Russian.) Moscow.
- Protserov, A. V. 1950. (In Russian.) "Zasyxi na Evropeiskoi territorii SSSR" (Drought on the European territory of the Soviet Union). In: *Agroklimaticheskie usloviya stepei Ukrainskoi SSR i puti ulucheniya ix* (The agroclimatic conditions in the steppes of the Ukrainian SSR and ways to improve them). Academy of Sciences of the Ukrainian SSR, Kiev: 17–22.
- Radio Moscow: 0800. 1960. (In Russian.) *Radio Liberty Research*. 10 April.
- Radio Moscow: 0800. 1963. (In Russian.) *Radio Liberty Research*. 17 September.
- Radio Moscow-2: 1200. 1978. (In Russian.) 29 December.
- Radio Moscow Domestic Service in Russian: 16:00, GMT. 1980. (In Russian.) 28 March.
- Radio Riga, 0445 GMT. 1980. (In Russian.) 19 March.
- Radio Tallinn, 1000 GMT. 1979a. (In Russian.) 14 February.
- Radio Tallinn: 1000 GMT. 1979b. (In Russian.) 22 February.
- "Rape of the Virgin Lands Continues." 1969. *Radio Liberty Research*. 7 November.
- Rauner, U. L. 1982. (In Russian.) "Gruppirovka zasushlivykh let v zernovoi zone SSSR" (Grouping of dry years for the grain zone of the USSR). *Izvestia AN SSSR, seriya Geographia*, N5.
- Reston, R. "Serious Agricultural Lags Plague Soviets." 1969. *Radio Liberty Research*. 28 August.
- Reuter. 1978. 17 August.
- Reuter. 1980a. 9 September.
- Reuter. 1980b. 6 November.
- Reuter. 1980c. 1 December.
- Reuter. 1981. 12 October.
- Reuter. 1987. 18 October.
- Reuter. 1988a. 9 May.
- Reuter. 1988b. 1 September.
- Roberts, L. et. al. (eds.) 1996. *World resources: 1996–97*. Oxford University Press, New York.
- Rossiiskaya gosudarstvennaya statistika: 1802–1996* (Russia's state statistics: 1802–1996). 1996. (In Russian.) Goskomstat, Moscow.
- Rudenko, A. I. (ed.) 1958. (In Russian.) *Sazukhi v SSSR, ix proiskhozhenie, povtornyayemost' i vliyaniye na urozhai* (Droughts in the USSR, their origin, regularity and impact on harvests). *Gidrometeoizdat*, Leningrad.
- Sbornik statisticheskikh svedenii po Souzy SSR: 1918–1923* (Report on statistical data for the USSR for 1918–1923). 1924. (In Russian.) TsSU, Moscow.

- Schnemann, S. 1980. "Soviet food shortage." *Radio Liberty Research*. 26 June.
- Sedik, D. J. 2000. "Per Capita GDP and Meat Consumption in the Former USSR". *Economies in Transition/Agriculture Report*. Vol. 4, no. 4: 11–15.
- Seljaninov, G. P. 1966. (In Russian.) *Agroklimaticheskaja karta mira*. (Agroclimatic map of the world). Gidrometeoizdat, Leningrad.
- Sel'skaya Zhizn*. 1961. (In Russian.) 14 July.
- Sel'skaya Zhizn*. 1963. (In Russian.) 17 October.
- Sel'skaya Zhizn*. 1969. (In Russian.) 17 January.
- Sel'skaya Zhizn*. 1970. (In Russian.) 1 March.
- Sel'skaya Zhizn*. 1979. (In Russian.) 16 October.
- Sel'skoe khozyastvo Kazakhstana*. 1965. (In Russian.) N 10.
- Sel'skoe khozyastvo Komi ASSR* (Agriculture of Komi ASSR). 1951. (In Russian.) Academy of Sciences, Moscow.
- Sel'skoe khozyastvo Povolzhya*. 1955. (In Russian.) N3.
- Sel'skoe khozyastvo Povolzhya*. 1957. (In Russian.) N1.
- Sel'skoe khozyastvo Povolzhya*. 1963. (In Russian.) N1.
- Sel'skoe khozyastvo Povolzhya*. 1967. (In Russian.) N7.
- Sel'skoe khozyastvo SSSR: 1935. Ezhegodnik* (Agriculture of the USSR in 1935. Yearbook). 1936. (In Russian.) Moscow.
- Sel'skoe khozyastvo SSSR. Statisticheskii sbornik* (Agriculture of the USSR. Statistical report). 1971. (In Russian.) Moscow.
- Sel'skoe khozyastvo v Rossii* (Agriculture of Russia. Statistical report). 2000. (In Russian.) Goscomstat, Moscow.
- Sel'skoe khozyastvo v Rossii* (Agriculture of Russia. Statistical report). 2000. (In Russian.) Goscomstat, Moscow.
- Sel'skoe khozyastvo v SSSR v 1970* (Agriculture of the USSR in 1970). 1971. (In Russian.) Moscow.
- Sel'skoe khozyastvo SSSR. Statisticheskii sbornik* (Agriculture of the USSR. Statistical report). 1971. (In Russian.) Moscow.
- Serova, E. V. 1996. (In Russian.) "Ekonomicheskaya sodержanie agrarnoi reformy v Rossii: 1992–1995." In: *Kresyanovedenie. Ezhegodnik*. Moscow: 258–284.
- Settle, H. P. and J. D. Gruff. 1980. "USSR Strives to maintain Livestock Numbers Despite Tight Feed Supplies." *Foreign Agriculture*, June.
- Severin, B. S. and D. W. Carey. 1978. "The outlook for Soviet agriculture." In: H. Hunter (ed.). *The future of the Soviet Economy: 1978–1985*. (Westview special studies on the Soviet Union and Eastern Europe) Westview Press, Colorado: 100–129.
- Severin, K. 1979. "The expanding Soviet mixed-feed industry." *Foreign Agriculture*, October.
- Severin, K. 1984. "An Assessment of the Soviet Food Program." In: *The Soviet Economy after Brezhnev*. NATO Colloquium, 11–13 April. Brussels: 85–112.
- Smale, A. 1983. "Feature on Moscow food supplies." *Radio Liberty Research*. 15 January.
- Sotsialisticheskaya industriya*. 1982. (In Russian.) 9 April.
- Sotsialisticheskyy Vestnik*. 1962. (In Russian.) N5–6.

- Sovetskaya Latvia*. 1979. (In Russian.) 10 February.
- Sovetskaya Latvia*. 1987. (In Russian.) 20 June.
- Sovetskaya Latvia*. 1988. (In Russian.) 13 April.
- Sovetskaya Rossia*. 1962. (In Russian.) 15 September.
- Sovetskaya Rossia*. 1963. (In Russian.) 9 May.
- Sovetskaya Rossia*. 1968. (In Russian.) 12 November.
- Sovetskaya Rossia*. 1969. (In Russian.) 17 May.
- Sovetskaya Rossia*. 1970a. (In Russian.) 14 January.
- Sovetskaya Rossia*. 1970b. (In Russian.) 24 March.
- Sovetskaya Rossia*. 1970c. (In Russian.) 27 March.
- Sovetskaya Rossia*. 1971a. (In Russian.) 9 February.
- Sovetskaya Rossia*. 1971b. (In Russian.) 6 May.
- Sovetskaya Rossia*. 1972. (In Russian.) 18 April.
- Sovetskaya Rossia*. 1977. (In Russian.) 26 October.
- Sovetskaya Rossia*. 1978. (In Russian.) 12 January.
- Sovetskaya Rossia*. 1979. (In Russian.) 13 September.
- Sovetskaya Rossia*. 1983. (In Russian.) 24 June.
- Sovetskaya Rossia*. 1986a. (In Russian.) 11 June.
- Sovetskaya Rossia*. 1986b. (In Russian.) 26 June.
- Sovetskaya Rossia*. 1987. (In Russian.) 11 June.
- Sovetskaya Rossia*. 1991. (In Russian.) 2 July.
- "Soviet agriculture under fire." 1970. *Radio Liberty Research*. 30 April.
- Soviet Consumers: Increased purchasing power unmatched by supply." 1977. *Radio Liberty Research*. 5 December.
- "Soviet economy: 1974 results and 1975 prospects." 1975. *Radio Liberty Research*. March.
- Soviet Economy after Brezhnev*. 1984. NATO Colloquium, 11–13 April. Brussels.
- "Soviet economy in trouble despite Gorbachev reforms." 1988. *Radio Liberty Research*. 26 April.
- "Soviet New Year feasts without meat." 1978. *Radio Liberty Research*. 30 December.
- "Stalin's Collective Farm System Casts Shadow over Soviet Agriculture". 1964. *Radio Liberty Research*, 20 January.
- "State of agriculture in Vologda oblast." 1963. *Radio Liberty Research*, 16 May.
- "State of Soviet agriculture." 1964. *Radio Liberty Research*. 16 March.
- Statisticheskii ezhegodnik Rossii: 1901* (Statistical yearbook of Russia for 1901). 1902. (In Russian.) St. Petersburg.
- Statisticheskii ezhegodnik Rossii: 1904* (Statistical yearbook of Russia for 1904). 1905. (In Russian.) St. Petersburg.
- Statisticheskii ezhegodnik Rossii: 1911* (Statistical yearbook of Russia for 1911). 1912. (In Russian.) St. Petersburg.
- Statisticheskii ezhegodnik Rossii: 1913* (Statistical yearbook of Russia for 1913). 1914. (In Russian.) St. Petersburg.
- Statisticheskii ezhegodnik Rossii: 1914* (Statistical yearbook of Russia for 1914). 1915. (In Russian.) St. Petersburg.
- Statisticheskii ezhegodnik Rossii: 1915* (Statistical yearbook of Russia for 1915). 1916. (In Russian.) St. Petersburg.

- Statisticheskii ezhegodnik: 1918–1920* (Statistical yearbook for 1918–20). 1921. (In Russian.) Vol. 1. Moscow–Leningrad.
- Statisticheskii ezhegodnik 1921* (Statistical yearbook for 1921). 1922. (In Russian.) Vol. 1. Moscow.
- Statistika Rossiiskoi Imperii: 1883–1887* (Statistics of the Russian Empire: 1883–1887). 1888. (In Russian.) Vol. IV. St. Petersburg.
- Statisticheskii sbornik po Saratovskoi gubernii* (Statistical report for Saratovskaya province). 1923. (In Russian.) Saratov.
- Sunday Times*. 1980. 1 September.
- “Tackling the Problems of Soil Erosion in Kazakhstan.” 1965. *Radio Liberty Research*. 16 November.
- Teague, E. 1987. “Villagers protest about shortage of sugar.” *Radio Liberty Research*. 27 August.
- Tenson, A. 1975. “About decline of meat production in the USSR.” *Radio Liberty Research*. 10 January.
- “The Soviet Grain and Fodder Balance: 1981–82.” 1982. *Radio Liberty Research*. 3 February.
- Time Magazine*. 1962. 23 November.
- Times*. 1978. 7 November.
- Times*. 1980. 5 April.
- Times*. 1988. 2 May.
- Trud*. 1979. (In Russian.) 10 November.
- Trud*. 1982. (In Russian.) 28 August.
- Trud*. 1987. (In Russian.) 8 January.
- Trudy Gidrometeorologicheskogo instituta SSSR* (Proceedings of the hydro-meteorological institute of the USSR). 1978. (In Russian.) Vol. 193. Gidrometeizdat, Leningrad.
- Trudy Tsentralnogo statisticheskogo upravleniya. Statisticheskii ezhegodnik* (Proceedings of the Central Statistical Agency. Statistical yearbook). 1922. (In Russian.) Vol. 11, issue 1. Moscow.
- Tsentralny industrial'ny raion. Trudy Gosplana* (Central industrial region. Proceedings of the State Planning Committee). 1925. (In Russian.) Moscow.
- “Ukrainian writer appeals for conservation of bread.” 1981. *Radio Liberty Research*. 2 September.
- United Press International*. 1963. 15 September.
- “USSR National Affairs. Agricultural Affairs. CSA reports on 1978 livestock produce statistics.” 1979. *Radio Liberty Research*. 25 January.
- “USSR national affairs. Political and social developments.” 1981. *Radio Liberty Research*. 3 June.
- “USSR reports food shortages in Soviet Union.” 1983. *Radio Liberty Research*. 31 March.
- “USSR: The impact of recent climate change on grain production.” 1976. *CLA, Office of Economic Research Report*. October.
- Uteshev, A. G. 1963. (In Russian.) *Atmosfernyye zasukhi v Kazakhstane* (Atmospheric droughts in Kazakhstan). Alma-Ata.
- Vert, N. 1995. (In Russian.) *Istoriya Sovetskogo gosudarstva* (History of the Soviet state). Progress-Academia, Moscow.

- Vestnik cel'skokhozyastvennoi nauki*. 1963. (In Russian.) N11.
- Vestnik statistiki*. 1960, N6.
- Vilensky, Y. L. 1980. (In Russian.) *Likvidatsiya bezrabototsy i agrarnogo perenase-leniya v Srednei Asii i Kazakhstane: 1917–1932* (The liquidation of unem-ployment and agrarian overpopulation in Central Asia and Kazakhstan: 1917–1932). Alma-Ata.
- Viola, L., V. Danilov and R. Manning (eds.). 2000–2002. (In Russian.) *Trage-diya sovetsoi derevni: kollektivizatsiya i raskulachivanie: 1927–1939* (The tragedy of the Soviet village: 1927–1939). Vols. 2–4. ROSSPEN, Moscow.
- Voeikov, A. I. 1963. (In Russian.) *Vozdeistvie cheloveka na prirodu* (The impact of men on nature). Academy of Sciences, Moscow.
- Voprosy ekonomiki*. 1958. N3: 65.
- Voprosy ekonomiki*. 1958. N7: 20–21.
- Voskresensky, L. 1982. (In Russian.) *Selskoe khozyastvo SSSR. Mif i realnost* (Agriculture of the USSR. Myth and reality). APN. Russian service, 18.06.
- Wadekin, K.-E. 1978. "On the calculation of Soviet grain losses." *Radio Liberty Research*. 5 April.
- Wadekin, K.-E. 1980a. "Stagnation in Soviet livestock farming." *Radio Liberty Research*. 29 May.
- Wadekin, K.-E. 1980b. "The public livestock sector draws on private animal holdings." *Radio Liberty Research*. 8 December.
- Wadekin, K.-E. 1981. "The outlook for meat and grain output in 1981–85." *Radio Liberty Research*. 24 February.
- Wall Street Journal*. 1983. 13 February.
- Wall Street Journal*. 1986. 9 May.
- Washington Post*. 1966. 25 October.
- Washington Post*. 1969. 1 November.
- Washington Post*. 1980. 20 July.
- Washington Post*. 1981. 3 September.
- Washington Star*. 1975. 10 September.
- Washington Star*. 1980. 8 January.
- "Western analysts on Soviet meat production." 1980. *Radio Liberty Research*. 20 May.
- Wheatcroft, S. G. 1974. (In Russian.) "The Reliability of Russian Prewar Grain Output Statistics." *Soviet Studies*, XXVI.
- Wheatcroft, S. G. 1992. "The 1891–92 famine in Russia: towards a more detailed analysis of its scale and demographic significance." In: L. Edmond-son and P. Waldron (eds.). *Economy and Society in Russia and the Soviet Union, 1860–1930*. London: 44–64.
- Wheatcroft, S. G. and R. W. Davies. 1994a. "Agriculture." In: R. W. Davies, M. Harrison and S. G. Wheatcroft (eds.). *The Economic Transformation of the Soviet Union, 1913–1945*. Cambridge University Press: 106–115.
- Wheatcroft, S. G. and R. W. Davies. 1994b. "The Crooked Mirror of Soviet Economic Statistics." In: R. W. Davies, M. Harrison and S. G. Wheatcroft (eds.). *The Economic Transformation of the Soviet Union, 1913–1945*. Cambridge University Press: 24–37.
- White, C. 1987. *Russia and America: the Roots of Economic Divergence*.

- Whitley, C. R. 1980a. "Soviet agricultural failures plague people, dim Olympic fetes." *Radio Liberty Research*. 26 June.
- Whitney, G. R. 1980b. "Suddenly a consumers' paradise." *Radio Liberty Research*. 17 July.
- Yakovlev, N. et al. 1964. (In Russian.) "Droughts in the USSR and ways to combat them in relation to agriculture." *Zemlevedenie*, N3: 14–20.
- Yutkropht, S. 2001. "O zernovykh balansakh i otsenkakh urozhainosti v SSSR v 1931–1933" (On the grain balance and evaluations of harvests in the USSR, 1931–1933). In: L. Viola, V. Danilov and R. Manning (eds.). *Tragediya sovetskoi derevni: kollektivizatsiya i raskulachivanie: 1927–1939* (The tragedy of the Soviet village: 1927–1939). Vol. 3. ROSSPEN, Moscow: 842–885.
- Zak, S. 1925. (In Russian.) "Tseny i celskoe khozyastvo" (Prices and agriculture). In: *Selskoe khozyastvo na putyakh vosstanovleniya* (Agriculture on the way to recovery). Moscow.
- Zavarina, M. V. 1954. (In Russian.) *Zasukha i bor'ba s nei* (Droughts and the fight against them). Geografiz, Moscow.
- Zeimetz, K. 1990. *Chernobyl and the Soviet food economy. Communist Agriculture (Farming in the Soviet Union and Eastern Europe)* Ed. Karl-Eugen Wadekin. Routledge, London–New York.
- Zima, V. F. 1996. (In Russian.) *Famine in the USSR in 1946–1947: origin and consequences*. Moscow.

Index

- Africa, 55
Agro-industrial complexes, 269,
270, 331
Alaska, 1
Aliev Geidar, 317
Almaty, 213
Altai region, 186, 200, 202, 300, 347
Andropov Y. V., 324, 325
anti-alcohol campaign, 328, 329
Antonov Al., 97
arctic air mass, 6, 48, 55, 85, 246,
297
Argentina, 261, 296, 304
aridity, 5, 354
Arkhangelskaya province, 2, 103,
105, 138, 246, 319
Armavir, 243
Astrakhanskaya province, 47, 67,
102, 105, 126, 192, 310
Australia, 35, 229, 261, 293
Azerbaijan, 317

Baikal Amurskaya Trans-Siberian
railway, 292, 315
Baku, 317
Baltic republics, 297, 308, 315, 316,
317
Bashkortan, 98, 127, 129, 130, 132,
139, 142, 319
Belarus, 6, 34, 54, 63, 67, 227, 233,
246, 281, 294, 297, 299, 316, 317,
326
Belgorodskaya province, 233, 300,
333

biological yield, 24, 25, 116, 132,
135, 136, 172, 187, 341
Bolsheviks, 65, 69, 94, 95, 107, 108,
265
Brazil, 229
Brezhnev L.I., 193, 219, 233, 237,
263, 268, 272, 277, 303, 317, 320,
323, 324, 332, 338
Bryanskaya province, 328
Bulgaria, 264, 312, 323

Canada, 35, 145, 213, 223, 327
cannibalism, 100, 103, 144, 147, 167
Caspian Sea, 46, 84, 310
Central Asia, 17, 35, 38, 64, 67, 70,
212, 213, 225, 295, 359
Chelyabinskaya province, 101, 104,
129, 319, 320
Cherepovetsk, 320
Chernigov, 63, 87
Chernobyl accident, 326, 360
Chuvashia, 98, 99, 100, 104, 105
civil war of 1918–1920, 69, 94, 118
collectivization, 123, 126, 139, 140,
143, 145, 157, 159, 180, 204, 347
commune, 31, 33, 41, 71, 73, 88, 97,
106, 148
consumption regions, 65, 86, 95, 97,
105, 138, 341, 342
Corn campaign, 188, 189, 223
Crimea, 39, 54, 55, 84, 86, 89, 225,
245
Cuba, 210, 229
Czechoslovakia, 29, 32

- Dagestan, 192, 235
 dekulakization, 112, 139, 140
 Denmark, 36, 308
 deportation, 112, 140, 149
 developed socialism, 219, 267
 Dnepropetrovskaya province, 147
 Dnieper river, 198
 Don river, 297
 Donetskaya province, 89, 107, 147, 210, 211
 drought (synoptic characteristic)
 in 1891, 54–57
 in 1901, 46–49
 in 1906, 49–51
 in 1911, 51–53
 in 1920, 82–84
 in 1921, 84–86
 in 1924, 87–89
 in 1931, 126–128
 in 1936, 132–134
 in 1946, 162–164
 in 1963, 200–204
 in 1965, 205–207
 in 1972, 245–249
 in 1975, 249–252
 in 1979, 293–296
 in 1981, 299–304
 in 1984, 304–305
 drought index, 44, 45, 46, 48, 80, 89, 123, 242, 249
 dry winds (“sukhovei”), 9, 48, 50, 55, 87, 98, 128, 133, 134, 165, 342
 dust storms (“mgla”), 9, 124, 125, 133, 196, 197–199, 202, 206, 241, 242, 243, 244, 249, 304, 342, 347, 352
 Common Market, 261, 326

 Ekaterinoslavskaya province, 63, 89, 107
 epidemic, 58, 59, 93
 erosion, 186, 189, 191, 192, 194, 200, 202, 206, 223–225, 270, 337, 348, 358
 fallow lands, 39, 40, 172, 174, 186, 187, 188, 189, 191, 223, 224, 236, 245

 FAO, 28, 29, 254
 fertilizers, 10, 36, 40, 71, 73, 121, 190, 221–223, 228, 229, 241, 265, 273, 274, 336
 Finland, 29, 35, 254
 Five-year plan periods
 First (1928–32), 109, 116, 118, 152
 Fourth (1945–50), 155, 156
 Fifth (1951–55), 172
 Sixth (revised) (1956–60), 174
 Seventh (seven year period: 1959–1965), 221
 Eighth (1966–70), 221, 233, 245
 Ninth (1971–75), 221, 233, 235, 237, 240, 253, 260, 273
 Tenth (1976–80), 275, 276, 280, 281, 295, 298
 Eleventh (1981–85), 275, 276, 288, 324, 331
 Twelfth (1986–90), 275
 Flooding, 51, 87, 104, 189, 294
 food exports, 313, 323
 food consumption, 13, 14, 16, 18–21, 29, 34, 35, 61, 72, 90, 119, 151, 165, 230, 253, 254, 256, 266, 310, 311, 317
 food imports, 229, 230, 261, 265, 278, 326
 Food program, 270, 271, 277, 280, 287, 324, 347, 356
 food rationing, 110, 150, 168, 307, 321–323
 food tax, 74, 76, 101, 103, 114, 140
 forest fires, 8, 48, 82, 292, 299
 France, 36, 264
 Frost, 2, 4, 6, 7, 54, 55, 161, 244, 293, 295, 296, 297, 302, 303, 305, 306, 335

 Georgia, 67, 317, 323, 325
 Germany, 36, 42, 264, 312
 glasnost (openness), 285, 309
 Gorbachev, 12, 267, 277, 285, 290, 325, 327, 328, 329, 330
 Gorky (Nizhnii Novgorod), 213, 319, 320

- Gosplan, 14, 18, 19, 23, 25, 30, 135, 260, 269, 282, 341
- grain balance, 34, 35, 66, 92, 94, 104, 156, 157, 158, 166, 167, 177, 230, 232, 245, 338
- grain procurement, 12, 76, 94, 95, 96, 97, 98, 108, 109, 111, 116, 132, 137, 138, 139, 141, 142, 143, 144, 145, 151, 152, 167, 173, 175, 214, 215
- grain requirement, 10, 11, 34, 159, 178, 202, 217, 245, 266, 277
- grasslands, 10, 11, 42, 185, 188, 223, 234, 236, 286, 336
- growing season, 2, 3, 4, 6, 11, 155, 161, 174, 187, 188, 244, 268, 292
- Grozny, 210
- Gulf stream, 1
- hail, 6, 7, 51, 297
- heavy rains, 6, 126, 164, 204, 246
- Hungary, 197, 198, 242, 264, 312
- Hydro Thermal Coefficient (HTC), 45, 68, 80, 85, 126, 162
- import of grain, 40, 72, 214, 231, 233, 252, 257, 276–278, 296, 297, 304, 332, 338
- industrialization, 11, 78, 109, 113, 228, 230, 232, 233, 280, 281
- intensification, 10, 219, 220, 221
- investments, 10, 11, 12, 78, 183, 221, 222, 229, 267, 268, 269, 270, 272, 273, 330, 338
- Irkutsk city, 21, 67, 319, 322, 323
- Irtysk river, 52
- Ishim river, 52
- Ivanovo, 21, 126, 133, 191, 200
- Kalmykia, 192, 236
- Kaluzhskaya province, 43, 68, 138
- Kama river, 85, 126, 132, 320
- Karelia, 43, 67, 103, 105
- Kazakhstan, 3, 6, 10, 26, 148, 153, 164, 168, 172, 173, 174, 175, 185, 186, 193–202, 205, 206, 213, 216, 223–225, 242–245, 246, 247, 49–251, 277, 295, 297, 306, 337
- Kazan, 63, 67, 87, 210, 300, 316, 319, 322
- Kemerevo, 210, 236
- Khakasii, 200
- Kharkov, 63, 147, 148, 150, 207, 212, 233
- Khersonskaya province, 63, 202
- Kievskaya province, 63, 147, 149, 198, 202, 210, 258, 314, 318
- Kirgiz, 317
- Kirilov, 320
- Kirovograd, 164
- Klaipeda, 309, 310
- Kostroma, 21, 43, 67, 191
- Kosygin A.N., 219, 241
- Krasnodarskii Krai, 21, 181, 198, 206, 213, 214, 227, 236, 243, 249, 321
- Krasnoyarsk, 327
- Khrushchev N. S., 10, 12, 24, 25, 159, 167, 171–173, 175–177, 179, 180, 182–189, 191, 192, 193, 194, 204, 211, 213, 214, 217, 219, 221–223, 227–229, 252, 259, 266, 308, 312, 337
- kulak, 78, 79, 110, 112, 139, 140, 145, 342
- Kungur, 213
- Kurganskaya province, 250
- Kursk, 21, 43, 67, 94, 164, 214
- Kustanaiskaya province (Kazakhstan), 196
- labor force, 12, 73, 269
- land hunger, 37, 38
- Lenin V.I., 53, 69, 74, 222, 233, 260
- Leningradskaya province, 21, 73, 114, 115, 126, 134, 138, 210, 234, 246, 262, 264, 265, 307, 313–315, 318, 323
- Lipetskaya province, 236
- livestock complexes, 232, 233, 234, 238, 269, 280, 281, 338
- losses of grain, 63, 135, 194, 206, 245, 271
- Lysenko T.D., 160

- Machine-Tractor Station (MTS), 114, 122, 153, 159, 161, 182, 227, 342
- Madrid, 55
- Malenkov G.M., 171
- Mariiskaya republic, 98, 102, 103, 104
- market, 31–33, 40, 41, 54, 58, 60, 62–67, 69, 71–79, 95, 106–109, 110, 111, 115, 123, 139, 143, 145, 169, 211, 229, 230, 258, 259, 260, 261, 264, 265, 267, 277, 292, 293, 313, 314, 318, 324, 326–329, 335, 336
- marketability, 32, 33, 62, 65, 72, 75, 78, 79, 113–115, 143, 173, 214, 215, 229, 342
- Masherov, 294
- mass famine
in 1891, 54, 55, 56, 58, 59, 337
in 1920s, 13, 20, 21, 72, 76, 89, 90, 91, 93, 97–101, 103, 104, 105, 106, 107, 108, 109
in 1930s, 13, 124, 136, 138, 146, 147, 148, 150–153
in 1946–47, 166, 167–169, 211, 217
- meat consumption, 14, 28, 29, 238, 254, 262, 309, 313, 317, 319
- mechanization, 182, 183, 232, 281
- melioration, 74, 236, 270
- migration, 35, 38, 64, 70, 142, 146, 152, 159, 169, 269, 337
- Mikoyan Anastas, 117
- Minsk, 264, 265, 317, 318
- modernization, 5, 11, 31, 122, 155, 222, 230, 233, 238, 266
- Moldova, 166, 167, 233, 246, 273, 274, 281
- mortality, 19, 58, 59, 61, 93, 99, 100, 103, 148, 149, 150, 168
- Moscow, 26, 43, 54, 71, 93, 132, 170, 207, 210, 212, 213, 246, 252, 255, 257–260, 264, 265, 294, 300, 307, 314, 316, 318, 320, 322, 323, 325, 327, 328
- Moskovskaya province, 83, 114, 115, 129, 130, 134, 162, 190, 233, 234, 246, 300, 302, 303, 307, 322
- Murmanskaya province, 105, 210, 246
- Naberezhniye Chelny, 319, 320
- Nemkommuna (Volga region), 73, 88, 97, 102, 106, 148
- Netherlands, 29, 261, 264
- Neva river, 246
- New Economic Policy (NEP), 69, 74, 76, 86, 108
- New York, 49
- Non- black Earth zone, 38, 268, 269, 287, 292
- norm of consumption, 101, 120, 138, 142, 152, 168, 170, 238, 253, 254, 325
- Novgorodskaya province, 67, 73, 83
- Novocherkask, 209, 214
- Novokuznetsk, 260
- Novosibirskaya province, 200, 236, 263, 315, 319, 321
- Odesskaya province (Ukraine), 89, 107, 210, 213, 314, 321
- Olympic Games (1980), 317
- Omskaya province, 104, 105, 242
- Orenburgskaya province, 55, 67
- Orlovskaya province, 43, 59, 67, 73, 87, 94, 105, 107, 191, 212
- Ottawa, 213
- overpopulation, 36, 37, 38, 39, 59, 71
- Paris, 49
- pasture, 10, 11, 18, 37–39, 42, 118, 184–187, 189, 190–192, 199, 217, 224, 234, 235, 236, 285–288, 338, 341
- Pavlodarskaya province (Kazakhstan), 200, 202
- Pensenskaya province, 63, 87, 94
- perestroika (restructuring), 328
- Permskaya province, 43, 67, 102, 104, 105, 189, 327
- Petrograd, 12, 67
- Philippines, 229
- Podgorny N.V., 208
- podzolic soils, 4, 41, 268

- Poland, 17, 29, 36, 67, 125, 264, 312, 313, 323
- Politburo, 12, 135, 146, 303, 320
- Poltavskaya province (Ukraine), 63, 73, 107
- Popov P.I., 75, 86
- price scissors, 77
- prices, 14, 16, 40, 58, 61, 62, 65, 67, 73, 76–79, 105, 108, 110, 111, 173, 182, 183, 204, 208–210, 226, 227–229, 255, 257–259, 262, 265, 280, 297, 301, 311–313, 323, 324, 328, 329, 330–333, 338
- prodrazverstka, 65, 95–98, 101, 108
- productive regions, 11, 13, 60, 62, 69–72, 86, 87, 93, 97, 98, 104, 112–114, 117, 138, 152, 217, 271, 342
- Provisional Government, 65, 66
- Pskovskaya province, 21, 43, 67, 73, 103, 105, 138
- purchasing power, 257, 310
- railway network, 40, 60, 65, 66, 71, 146, 315
- Reagan Ronald, 301
- Red Army, 95, 97
- Revolution of 1917, 97, 151, 233, 298
- Romania, 125, 167, 197, 198, 312, 323
- Rostovskaya province, 50, 55, 192, 196, 202, 209–211, 213, 214, 236, 246, 304
- Ryazanskaya province, 21, 43, 67, 105, 179, 200, 300
- Rykov A., 138
- Samarskaya province, 21, 63, 67, 88, 94, 97, 100–102, 105, 107, 131, 195, 313, 319
- Samizdat, 316, 328, 342
- Saratovskaya province, 19, 21, 63, 67, 88, 97, 99, 101–105, 107, 132, 164, 196, 245, 250
- Severnaya Dvina river, 246
- Severo-Dvinskaya province, 73
- Shevarnadze Edward, 323
- Shortandy, 224, 225
- Simbirsk (Ul'yanovsk), 21, 43, 47, 63, 67, 87, 94, 101, 102, 105
- slaughtering, 27, 74, 119, 139, 149, 180, 203–205, 207, 211–213, 215, 217, 251, 252, 262, 291, 295, 296, 298, 299, 338
- Smolensk, 43, 191
- socialist countries, 14, 249, 312
- Solomentsev M.S., 231
- Soviet economy, 12, 69, 109, 116, 161, 200, 248, 249, 267, 306
- Soviet republics, 153, 182, 305, 317, 328
- speculators, 110, 111, 213
- St. Petersburg, 67
- stagnation, 10, 155, 157, 199, 267, 288, 290, 309
- Stalin, 16, 23, 29, 69, 78, 79, 108, 110, 112, 118, 138, 146, 150, 152, 153, 155, 156, 158–160, 166, 171
- stall period, 11, 234
- Stavropolskaya province, 21, 67, 88, 101, 102, 103, 192, 196, 198, 202, 214, 235, 243
- steppe zone, 2, 3, 6, 11, 46, 126, 130, 160, 164, 173, 189, 223, 224, 243, 249, 268, 270, 286, 292, 335, 342
- Stolypin P.A., 33, 44
- subsistence farming, 33, 71, 74, 336
- Sverdlovsk (Ekaterinoburg), 21, 101, 132, 321
- Taganrog, 211
- Tallinn, 315, 318, 321
- Tambovskaya province, 21, 43, 47, 63, 67, 87, 88, 105, 107, 190, 233
- Tartu, 315
- Tatarstan, 21, 98, 100, 101, 105, 115, 127, 130, 143, 316, 319, 332
- tax, 21, 58, 74, 76, 77, 79, 98, 101, 103, 105, 106, 114, 140, 149, 255, 271, 329
- three fields farming, 39, 40, 41
- Tobol river, 52

- Tobolskaya province, 52, 67, 321
Togliatti, 320
Tomskaya province, 48, 67, 234
Tumenskaya province, 102, 104
Turkmenistan, 317
Tverskaya province, 21, 43, 67, 83
Tyumen,

Ufa river, 52, 126
United Kingdom, 49
United States, 1, 2, 4, 5, 11, 16, 29,
32, 35, 36, 49, 100, 175, 181, 188,
193, 205, 207, 222, 223, 232, 253,
258, 261, 273, 279, 285, 286, 296,
304, 311, 326
USDA, 14, 26, 27, 28, 29, 291,
299–301, 309

virgin land campaign, 10, 24, 26,
121, 172, 173, 174, 175, 176,
177, 186, 188, 189, 191–197,
200, 202, 204, 205, 206,
213–215, 217, 219, 220,
223–225, 240, 242, 245, 247,
249, 258, 268, 287, 337
Virginia, 11
Vladimirskaya province, 21, 43, 68,
138, 200, 208, 255
Volga river, 52, 126, 129, 310

Volgogradskaya province, 47, 55, 87,
103, 126, 165, 166, 167, 190, 236,
244, 250
Vologodskaya province, 43, 103, 189,
190, 320, 321, 322
Volynskaya province, 202
Voronezhskaya province, 21, 47, 67,
87, 88, 107, 134, 191, 263
Vyatka river, 189

war communism, 71, 72, 74, 110
weeds, 4, 28, 86, 121, 160, 206, 223
western countries, 2, 13, 28, 99, 161,
181, 221, 254, 267, 278, 279, 284,
293, 295, 310, 317, 338, 339
Williams V.R., 160, 161, 146
wooded steppe zone, 2, 3, 6, 40, 41,
42, 160, 342
world market, 32, 143, 229, 277, 292,
293, 314
World Meteorological Organization,
302
World War I, 31, 32, 36, 38, 41, 44
World War II, 10, 36, 109, 155, 161

Yakutia, 319
Yaroslavskaya province, 43, 67, 105,
133, 138, 191, 210
Yugoslavia, 197

In addition to its academic interest, this book has been written to fill a gap in the information about food problems in the Soviet Union. Historians are, as a rule, interested in the more dramatic food crises that occurred in the Stalin era. However, new historical sources have become available only recently, providing new facts in this area. The materials show, for example, that a mass famine occurred among Russian peasants in 1924, even though this period is regarded as a time of dynamic economic development in Soviet Russia as a result of the New Economic Policy. Even less is known about the food situation in the Soviet Union during the Brezhnev period. Everybody knows that the USSR faced chronic food problems in the 1970s and 1980s, but the scale of these problems, their geographical distribution, chronological extent and correspondence to climate vagaries have still not been investigated. In the historical literature of this period, coverage of food and agriculture issues is even more scarce than in earlier times, because of the suppression of any information about food difficulties in the regions of the USSR in the era of "developed socialism."

From the Preface



"DON'T LET NIGHT HINDER YOUR WORK"
1956



"MOVING TO NEW PLACES WITH THE WHOLE FAMILY"
1957

ISBN 963 7326 10 3



Central European University Press

Budapest – New York

Sales and information: ceupress@ceu.hu

Website: <http://www.ceupress.com>